UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

RIVERKEEPER, INC., Natural Resources Defense Council, Waterkeeper Alliance, Soundkeeper, Inc., Scenic Hudson, Inc., Save the Bay-People for Narragansett Bay, Friends of Casco Bay, American Littoral Society, Delaware Riverkeeper Network, Hackensack Riverkeeper, Inc., New York/New Jersey Baykeeper, Santa Monica Baykeeper, San Diego Baykeeper, California Coastkeeper, Columbia Riverkeeper, Conservation Law Foundation, Surfrider Foundation, State of Rhode Island, State of Connecticut, State of Delaware, Commonwealth of Massachusetts, State of New Jersey, State of New York, Appalachian Power Company, Illinois Energy Association, Utility Water Act Group, PSEG Fossil LLC, PSEG Nuclear LLC, Entergy Corporation,
Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, STEPHEN L. JOHNSON, in his official capacity as Administrator of the United States Environmental Protection Agency,
Respondents.

Docket Nos. 04-6692-ag(L), 04-6693-ag(CON), 04-6694-ag(CON), 04-6695-ag(CON), 04-6696-ag(CON), 04-6697-ag(CON), 04-6698-ag(CON), 04-6699-ag(CON).

Argued: June 8, 2006.
Decided: Jan. 25, 2007.

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425 F.3d 83

Before STRAUB, SOTOMAYOR, and HALL, Circuit Judges.

SOTOMAYOR, Circuit Judge.

This is a case about fish and other aquatic organisms. Power plants and other industrial operations withdraw billions of gallons of water from the nation's waterways each day to cool their facilities. The flow of water into these plants traps (or "impinges") large aquatic organisms against grills or screens, which cover the intake structures, and draws (or "entrains") small aquatic organisms into the cooling mechanism; the resulting impingement and entrainment from these operations kill or injure billions of aquatic organisms every year. Petitioners here challenge a rule promulgated by the Environmental Protection Agency ("the EPA" or "the Agency") pursuant to section 316(b) of the Clean Water Act ("CWA" or "the Act"), 33 U.S.C. § 1326(b),[1] that is intended to protect fish, shellfish, and other aquatic organisms from being harmed or killed by regulating "cooling water intake structures" at large, existing power-producing facilities.

For the reasons that follow, we grant in part and deny in part the petitions for review, concluding that certain aspects of the EPA's rule are based on a

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[1] We refer to statutory provisions mentioned in the text by their section in the CWA and provide in citations both the section of the Act and the parallel section of the United States Code.

reasonable interpretation of the Act and supported by substantial evidence in the administrative record, but remanding several aspects of the rule because they are inadequately explained or inconsistent with the statute, or because the EPA failed to give adequate notice of its rulemaking. We also dismiss for lack of jurisdiction one aspect of the petitions because there is no final agency action to review.

BACKGROUND

Our decision in *Riverkeeper, Inc. v. EPA*, 358 F.3d 174 (2d. Cir. 2004) ("*Riverkeeper I*"), which addressed challenges to the EPA's rule governing cooling water intake structures at new—as opposed to existing—facilities discusses at length the procedural and factual background of the rulemaking pursuant to section 316(b). We presume familiarity with Riverkeeper I and provide here only a brief overview of the statute and the various stages of the rulemaking.

These consolidated petitions for review concern a final rule promulgated by the EPA regarding the water that large, existing power plants withdraw from rivers, lakes, and other waterways of the United States to cool their facilities. *See* 40 C.F.R. § 125.91(a). This cooling process requires power plants to extract billions of gallons of water per day from the nation's waters, thereby impinging and entraining a huge number of aquatic organisms. *Riverkeeper I*, 358 F.3d at 181. Indeed, a single power plant can kill or injure billions of aquatic organisms in a single year. *Id.*

Cognizant of this problem, Congress in 1972 amended the CWA, 33 U.S.C. §§ 1251-1387, to regulate cooling water intake structures. *See* Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816 (1972). We have described Congress's regulation of such structures as "something

of an afterthought," *Riverkeeper I*, 358 F.3d at 186 n. 12, given that the directive appears in a section of the Act addressing the seemingly unrelated issue of thermal pollution, *see* CWA § 316(a), 33 U.S.C. § 1326(a). The Act, as amended, provides that "[a]ny standard established pursuant to section 1311 of this title [CWA section 301] or section 1316 of this title [CWA section 306] and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." CWA § 316(b), 33 U.S.C. § 1326(b).

The provisions of the Act cross-referenced in section 316(b) direct the EPA to issue rules regulating the discharge of pollution from existing point sources, CWA § 301, 33 U.S.C. § 1311, and new point sources, CWA § 306, 33 U.S.C. § 1316.[2] As we noted in *Riverkeeper I*, "[w]hen the EPA established new source performance discharge standard[s] ... it ought *then* to have regulated ... intake structures ...." 358 F.3d at 185 (internal quotation marks omitted; emphasis in original). Put differently, section 316(b) required the EPA to promulgate regulations for cooling water intake structures at the same time that it established pollution discharge standards pursuant to sections 301 and 306. The EPA's first attempt at regulation under section 316(b), however, was remanded by the Fourth Circuit in 1977 on procedural grounds, and years passed without the EPA issuing new rules. *Id.* at 181 (citing *Appalachian Power Co. v. Train*, 566 F.2d 451 (4th Cir. 1977)). Environmental

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[2] A "point source" is "any discernible, confined and discrete conveyance ... from which pollutants are or may be discharged." 33 U.S.C. § 1362(14).

groups ultimately sued the EPA and won a consent decree, pursuant to which the Agency established a timetable to issue rules pursuant to Section 316(b) in three "phases." *Id.* & n. 3. Phase I—addressed in *Riverkeeper I*—governs new facilities; Phase II—addressed here—covers large, existing power plants; and Phase III will regulate existing power plants not governed by Phase II, as well as other industrial facilities. *See Riverkeeper, Inc. v. Whitman*, 2001 WL 1505497, at *1 n. 3 (S.D.N.Y. Nov. 27, 2001).

Our interpretation of section 316(b) is informed by the two provisions it cross-references, CWA sections 301 and 306. Section 301 sets forth a framework under which limitations on the discharge of pollutants from existing sources would become more stringent over time. CWA § 301(b), 33 U.S.C. § 1311(b); *see Riverkeeper I*, 358 F.3d at 185.

Section 301(b)(1)(A) required the EPA, beginning in 1977, to set effluent limitations for existing sources based on "the best practicable control technology currently available," or "BPT." CWA § 301(b)(1)(A), 33 U.S.C. § 1311(b)(1)(A). By 1989, existing source effluent limitations were to be based on the more stringent "best available technology economically achievable," or "BAT." CWA § 301(b)(2)(A), 33 U.S.C. § 1311(b)(2)(A). Additionally, section 306 requires the EPA to establish "standards of performance" for the control of the discharge of pollutants from new sources based on "the best available demonstrated control technology," a standard that "reflects the greatest degree of effluent reduction." CWA § 306(a)(1), 33 U.S.C. § 1316(a)(1).

In section 316(b), Congress established yet another standard to govern cooling water intake structures, which requires such structures to reflect the "best technology available for minimizing adverse

environmental impact," or "BTA." CWA § 316(b), 33 U.S.C. § 1326(b). We noted in *Riverkeeper I* that "[a]lthough the EPA is permitted to consider a technology's cost in determining whether it is 'practicable,' 'economically achievable,' or 'available,' it should give decreasing weight to expense as facilities have time to plan ahead to meet tougher restrictions." 358 F.3d at 185 (citations omitted). Additionally, we observed that "[b]ecause section 316(b) refers to sections 301 and 306 but provides a different standard ('best technology available for minimizing adverse environmental impact' instead of, for example, 'best available demonstrated control technology') and does not explicitly provide that regulations pursuant to section 316(b) are subject to the requirements of sections 301 and 306, we think it is permissible for the EPA to look to those sections for guidance but to decide that not every statutory directive contained therein is applicable" to rulemaking under section 316(b). *Id.* at 187. With this general background in mind, we consider Phases I and II of the EPA's rulemaking.

I. *The Phase I Rule*

On December 18, 2001, the EPA issued its first rule ("the Phase I Rule") governing cooling water intake structures for new—as opposed to existing— facilities. *Regulations Addressing Cooling Water Intake Structures for New Facilities; Final Rule*, 66 Fed. Reg. 65,256 (Dec. 18, 2001) (codified at 40 C.F.R. pts. 9, 122-25). The Phase I Rule established a two-track approach to regulating cooling water intake systems at new facilities, under which a new facility could choose one of two "tracks" to comply with the statute. Track I created national intake capacity and velocity standards

based on closed-cycle cooling technology,[3] which the EPA deemed the best technology available for minimizing adverse environmental impacts. *See Riverkeeper I*, 358 F.3d at 182-83. Track II did not require the use of any specific technology so long as the facility "can show, in a demonstration study, 'that the technologies employed will reduce the level of adverse environmental impact ... to a comparable level to that which' would be achieved applying Track I's capacity and velocity requirements." *Id.* at 183 (quoting 40 C.F.R. § 125.84(d)(1)).

Environmental and industry groups challenged certain aspects of the rule, including, *inter alia*, the part of the Track II procedure allowing power plants to comply with section 316(b) by undertaking so-called "restoration measures," such as restocking the waterbody with fish, reclaiming abandoned mines to reduce drain-off, or removing barriers to fish migration, to maintain fish and shellfish in a waterbody at certain levels. In *Riverkeeper I*, we upheld most aspects of the Phase I Rule, but remanded the provisions relating to the Track II restoration option. We found that the restoration option was inconsistent

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[3] As we noted in *Riverkeeper I*,

> Cooling water systems fall into three groups. "Once-through" systems take water in, use it to absorb heat, and return the water to its source at a higher temperature. "Closed-cycle" systems recirculate the water (after allowing it to cool off in a reservoir or tower before being reused) and add water to the system only to replace that which is lost through evaporation. Closed-cycle systems, therefore, withdraw far less water than once-through systems. Dry cooling systems ... use air drafts to transfer heat, and, as their name implies, they use little or no water.

358 F.3d at 182 n. 5 (internal citations omitted).

with section 316(b)'s requirement that the EPA minimize adverse environmental impacts by regulating the "'location, design, construction, and capacity of cooling water intake structures'" because this option has nothing to do with the location, design, construction, or capacity of such structures. *Id.* at 189 (quoting CWA § 316(b), 33 U.S.C. § 1326(b)). Given this, we held that the EPA had impermissibly exceeded its authority in allowing Phase I facilities to use these restoration measures to comply with regulations implementing the statute. *Id.*

II. *The Phase II Rule*

On July 9, 2004, the EPA issued a final rule, pursuant to the second phase of the consent decree ("the Phase II Rule" or "the Rule"), that governs cooling water intake structures at large, existing power plants. *See Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities*, 69 Fed. Reg. 41,576 (July 9, 2004) (codified at 40 C.F.R. pts. 9, 122-125). The Phase II Rule covers existing facilities that are "point sources" and that, as their primary activity, "both generate[ ] and transmit[ ] electric power, or generate[ ] electric power but sell[ ] it to another entity for transmission," "use[ ] or propose[ ] to use cooling water intake structures with a total design intake flow of 50 million gallons per day (MGD) or more," and "use[ ] at least 25 percent of water withdrawn exclusively for cooling purposes." 40 C.F.R. § 125.91. Although we will discuss the specifics of the Rule with respect to each challenge, we provide here an overview of the Rule.

The Phase II Rule sets forth five compliance alternatives. *See* 40 C.F.R. § 125.94(a). Section 125.94(a) requires that a facility select and implement one of the following "for establishing best technology

available for minimizing adverse environmental impact":

(1)(i) You may demonstrate to the Director that you have reduced, or will reduce, your flow commensurate with a closed-cycle recirculating system. In this case, you are deemed to have met the applicable performance standards and will not be required to demonstrate further that your facility meets the impingement mortality and entrainment performance standards specified in paragraph (b) of this section ....; or

(ii) You may demonstrate to the Director that you have reduced, or will reduce, your maximum through-screen design intake velocity to 0.5 ft/s or less. In this case, you are deemed to have met the impingement mortality performance standards and will not be required to demonstrate further that your facility meets the performance standards for impingement mortality specified in paragraph (b) of this section and you are not subject to the requirements in §§ 125.95, 125.96, 125.97, or 125.98 as they apply to impingement mortality. However, you are still subject to any applicable requirements for entrainment reduction .... [;]

(2) You may demonstrate to the Director that your existing design and construction technologies, operational measures, and/or restoration measures meet the performance standards specified in paragraph (b) of this section and/or the restoration requirements in paragraph (c) of this section[;]

(3) You may demonstrate to the Director that you have selected, and will install and properly operate and maintain, design and construction

> technologies, operational measures, and/or restoration measures that will, in combination with any existing design and construction technologies, operational measures, and/or restoration measures, meet the performance standards specified in paragraph (b) of this section and/or the restoration requirements in paragraph (c) of this section;
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> (4) You may demonstrate to the Director that you have installed, or will install, and properly operate and maintain an approved design and construction technology in accordance with § 125.99(a) or (b); or
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> (5) You may demonstrate to the Director that you have selected, installed, and are properly operating and maintaining, or will install and properly operate and maintain design and construction technologies, operational measures, and/or restoration measures that the Director has determined to be the best technology available to minimize adverse environmental impact for your facility in accordance with paragraphs (a)(5)(i) or (ii) of this section ....

40 C.F.R. § 125.94(a).

The Phase II Rule does not require large, existing power plants to install closed-cycle cooling systems, although a facility with such a system (or one whose intake flow is commensurate with that of a closed-cycle system) will be considered in compliance with the Rule. 40 C.F.R. § 125.94(a)(1)(i). The Rule instead references national performance standards, discussed below, that "are based on consideration of a range of technologies that EPA has determined to be commercially available for the industries affected as a whole." 69 Fed. Reg. at 41,598-99. And rather than limiting BTA to

technologies based on closed-cycle cooling systems, the EPA designated a "suite" of technologies—including fine- and wide-mesh wedgewire screens, aquatic filter barrier systems, barrier nets, and fish return systems, among others, *id.* at 41,599; *see also* 40 C.F.R. § 125.99(a)—as BTA for large, existing power plants.

Section 125.94(b) establishes national performance standards to be achieved through one of the compliance alternatives set forth in section 125.94(a). With respect to impingement mortality, it provides that facilities choosing "compliance alternatives in paragraphs (a)(2), (a)(3), or (a)(4) of this section ... must reduce impingement mortality for all life stages of fish and shellfish by 80 to 95 percent from the calculation baseline."[4] *Id.* § 125.94(b)(1). With respect to entrainment, facilities that choose

> compliance alternatives in paragraphs (a)(1)(ii), (a)(2), (a)(3), or (a)(4) of this section ... must also reduce entrainment of all life stages of fish and shellfish by 60 to 90 percent from the calculation baseline if:
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> (i) [the] facility has a capacity utilization rate of 15 percent or greater, and
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> (ii)(A) ... uses cooling water withdrawn from a tidal river, estuary, ocean, or one of the Great Lakes; or (B) ... uses cooling water withdrawn from a freshwater river or stream and the design intake flow of your cooling water intake

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[4] The "calculation baseline" is "an estimate of impingement mortality and entrainment that would occur" at a specific site based on a number of quantitative assumptions regarding intake velocity and the location and design of the site's intake structures. 40 C.F.R. § 125.93. The regulation also permits a site's specific historical and current data on impingement and entrainment to serve as a basis for this baseline. *Id.*

> structures is greater than five percent of the mean annual flow.

Id. § 125.94(b)(2).

Section 125.94(c) permits facilities to comply with the Rule by implementing restoration measures "in place of or as a supplement to installing design and control technologies and/or adopting operational measures that reduce impingement mortality and entrainment." *Id.* § 125.94(c). In order to adopt restoration measures under the Rule, a facility must demonstrate that "meeting the applicable performance standards or site-specific requirements through the use of design and construction technologies and/or operational measures alone is less feasible, less cost-effective, or less environmentally desirable than meeting the standards ... through the use of restoration measures." *Id.* § 125.94(c)(1). Moreover, the restoration measures implemented by the facility must produce ecological benefits "at a level that is substantially similar" to what would be achieved by meeting the national performance standards of section 125.94(b). *Id.* § 125.94(c)(2).

The compliance provision of section 125.94(a)(5) permits what is in effect a site-specific compliance alternative to the generally applicable performance standards in two circumstances. In the first circumstance ("the cost-cost compliance alternative" or "the cost-cost variance"), if a facility demonstrates that its compliance costs "would be significantly greater than the costs considered by the Administrator," the permitting authority must make a site-specific determination of BTA that is "as close as practicable to the applicable performance standards ... without resulting in costs that are significantly greater than the costs considered by the Administrator" in establishing those standards. 40 C.F.R. § 125.94(a)(5)(i). In the

second circumstance ("the cost-benefit compliance alternative" or "the cost-benefit variance"), the permitting authority must make a site-specific determination of BTA that is "as close as practicable" to the national performance standards if a facility demonstrates that its compliance costs would be "significantly greater than the benefits of complying" with the performance standards at the facility. *Id.* § 125.94(a)(5)(ii).

For those facilities installing technologies designated as BTA, section 125.94(d) allows the national performance standards set forth in section 125.94(b) to be satisfied by demonstrating compliance with a technology installation and operation plan ("TIOP"), which concerns, *inter alia*, a facility's installation, operation and maintenance of BTA. As the Rule is enforced through the permitting process under the National Pollutant Discharge Elimination System ("NPDES"),[5] section 125.94(d)(1) provides that a facility that uses one of the compliance methods other than closed-cycle cooling may request that compliance with the national performance standards during the first permit cycle be determined with respect to whether the facility has complied with the TIOP it submitted with its permit application. Section 125.94(d)(2) authorizes facilities to request that compliance during subsequent permit terms be determined based on whether a facility remains in compliance with its TIOP, and in accordance with any necessary revisions, "if applicable performance standards are not being met." 40 C.F.R. § 125.94(d)(2).

Finally, section 125.94(f) applies solely to nuclear power facilities. It provides that if a nuclear facility's

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[5] The NPDES process is promulgated under CWA section 402(a)(1), 33 U.S.C. § 1342(a)(1).

compliance with the Rule would conflict with a safety requirement established by the Nuclear Regulatory Commission, the EPA must make a site-specific determination of BTA that would not conflict with the Commission's safety requirement. 40 C.F.R. § 125.94(f).

For purposes of judicial review, the Phase II Rule was promulgated on July 23, 2004. *See* 69 Fed. Reg. at 41,576. Three sets of petitioners, discussed below, brought timely challenges to the Rule.[6]

DISCUSSION

I. *Standard Of Review*

We have jurisdiction to review this Rule pursuant to CWA section 509(b)(1), 33 U.S.C. § 1369(b)(1). *See Riverkeeper I*, 358 F.3d at 183 (stating that the Phase I Rule is covered by the jurisdictional grant of § 1369(b)(1)). As we explained in *Riverkeeper I*, our substantive review is twofold. "First, we examine the regulation against the statute that contains the EPA's charge." *Id.* at 184. If Congress "has directly spoken to the precise question at issue" and its intent is clear, we "must give effect to the unambiguously expressed intent of Congress." *Chevron U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837, 842-43, 104 S. Ct. 2778, 81 L.Ed.2d 694 (1984). If, however, the statute is silent or ambiguous, we ask whether "the agency's answer is based on a permissible construction of the statute." *Id.* at 843, 104 S. Ct. 2778.

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[6] The parties filed petitions for review here as well as in several of our sister circuits. The petitions were consolidated in the Ninth Circuit by order of the judicial panel on multi-district litigation pursuant to 28 U.S.C. §§ 1407 and 2112(a)(3). The Ninth Circuit thereafter transferred the case here pursuant to 28 U.S.C. § 2112(a)(5).

Second, if the agency has followed Congress's unambiguously expressed intent or permissibly construed an ambiguous statute, "we measure the regulation against the record developed during the rulemaking, but we 'hold unlawful' the agency's regulation only if it is 'arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.'" *Riverkeeper I*, 358 F.3d at 184 (quoting 5 U.S.C. § 706(2)(A)). "Normally, we must deem arbitrary and capricious an agency rule where 'the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.'" *Waterkeeper Alliance, Inc. v. EPA*, 399 F.3d 486, 498 (2d Cir. 2005) (quoting *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43, 103 S. Ct. 2856, 77 L.Ed.2d 443 (1983) (internal quotation marks and citations omitted)).

Finally, our review has a procedural dimension. The Administrative Procedure Act ("APA") requires that notice of proposed rulemaking be published in the Federal Register, 5 U.S.C. § 553(b)(3), and that interested parties be allowed an opportunity to comment on proposed rules, *id.* § 553(c). Where an agency fails to comply with the APA's notice and comment provisions, we remand to the agency for further proceedings. *See Sprint Corp. v. FCC*, 315 F.3d 369, 371 (D.C. Cir. 2003) ("Because the [agency] failed to provide adequate notice and opportunity to comment, we grant the petition and remand the case to the [agency].").

II. *The Petitions For Review*

The state petitioners[7] and the self-styled environmental petitioners[8] challenge the Rule on similar grounds. Their petitions contain the following arguments: (1) the EPA exceeded its authority in rejecting closed-cycle cooling as BTA for existing facilities generally, and the Agency's rejection of closed-cycle cooling as BTA for facilities on sensitive waterbodies is not entitled to deference because the decision was made at the direction of the Office of Management and Budget ("OMB"); (2) the EPA exceeded its authority by establishing ranges of acceptable performance rather than a single-numeric performance standard; (3) the CWA does not allow restoration measures as a means of compliance; (4) the EPA failed to give adequate notice that it would allow site-specific determinations of BTA based on cost-cost analysis, and the EPA impermissibly construed the statute to allow site-specific determinations of BTA based on cost-benefit analysis; (5) the provision allowing that compliance with the performance standards be determined by establishing compliance with a facility's TIOP is unauthorized and violates the rulemaking requirement of notice and comment; and (6) the Agency has classified certain new constructions as "existing facilities" contrary to the definitions set forth

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[7] Rhode Island, Connecticut, Delaware, Massachusetts, New Jersey, and New York.

[8] Riverkeeper, Inc., Natural Resources Defense Council, Waterkeeper Alliance, Soundkeeper, Inc., Scenic Hudson, Inc., Save the Bay–People for Narragansett Bay, Friends of Casco Bay, American Littoral Society, Delaware Riverkeeper Network, Hackensack Riverkeeper, Inc., New York/New Jersey Baykeeper, Santa Monica Baykeeper, San Diego Baykeeper, California Coastkeeper, Columbia Riverkeeper, Conservation Law Foundation, and Surfrider Foundation.

in the Phase I Rule without providing adequate notice and opportunity for comment.

Three groups of industry petitioners, which we will refer to collectively as the "industry petitioners" or individually as Entergy Corporation ("Entergy"), the Utility Water Act Group ("UWAG"),[9] and PSEG Fossil LLC and PSEG Nuclear LLC ("PSEG"), advance various challenges to the Phase II Rule. Their challenges raise the following arguments: (1) section 316(b) of the CWA does not apply to existing facilities; (2) the Agency's definition of "adverse environmental impact" is insufficiently supported by the record; (3) the EPA's assumption of zero entrainment survival is insufficiently supported by the record; (4) the EPA improperly requires evaluation of qualitative non-use benefits in site-specific cost-benefit analyses; (5) the Agency failed to account for the Rule's disproportionate impact on nuclear facilities; (6) the EPA gave inadequate notice of the independent-supplier provision; and (7) the Agency provided no notice of its post-rulemaking definition of "Great Lakes." The industry petitioners also seek to preserve the right on this petition for review to raise new challenges to the Rule if we remand significant aspects of it. We consider first the challenges raised by the state and environmental petitioners and then will turn to the industry petitioners' challenges.

III. *The State and Environmental Petitioners*

A. *Determination of BTA*

Perhaps the most significant challenge to the Phase II Rule is the petitioners' contention that the EPA exceeded its authority in rejecting closed-cycle cooling, and selecting instead the suite of technologies, as the

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[9] UWAG petitions this court in conjunction with the Appalachian Power Company and the Illinois Energy Association.

"best technology available" as required by section 316(b), 33 U.S.C. § 1326(b), in large part because the Agency engaged in improper cost considerations.

This challenge requires us at the outset to determine to what extent, if any, the EPA can consider cost when selecting "the best technology available for minimizing adverse environmental impact" under the statute.

1. *Cost Analysis Pursuant to Sections 301 and 306*

Section 316(b) does not itself set forth or cross-reference another statutory provision enumerating the specific factors that the EPA must consider in determining BTA. The statute, however, does make specific reference to CWA sections 301 and 306, which we have taken previously as "an invitation" to look to those sections for guidance in "discerning what factors Congress intended the EPA to consider in determining" BTA. *Riverkeeper I*, 358 F.3d at 186. We look to each of these statutes in turn.

Section 301(b)(1)(A) established the BPT standard that governed the effluent limitations applicable to existing sources through 1989. Congress provided that, in determining BPT, the Agency could consider "the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application." CWA § 304(b)(1)(B), 33 U.S.C. § 1314(b)(1)(B). As noted above, however, the CWA created standards that were to become increasingly stringent over time, and in 1989, the more lenient BPT standard for existing sources was replaced by the BAT standard of section 301(b)(2)(A), in which Congress provided that the EPA could consider only "the cost of achieving such effluent reduction." CWA § 304(b)(2)(B), 33 U.S.C. § 1314(b)(2)(B). Notably omitted from the list of permissible factors to which the

EPA could look in determining BAT was the cost of technology in relation to the benefits that technology could achieve.

This shift from BPT to BAT fundamentally altered the way in which the EPA could factor cost into its CWA determinations. Indeed, in analyzing BPT and BAT, the Supreme Court stated that in "assessing BAT[,] total cost is no longer to be considered in comparison to effluent reduction benefits," as it had been in assessing BPT. *EPA v. Nat'l Crushed Stone Ass'n*, 449 U.S. 64, 71, 101 S. Ct. 295, 66 L.Ed.2d 268 (1980). The Court indicated that the less stringent BPT standard had allowed for a "limited cost-benefit analysis" intended to "'limit the application of technology only where the additional degree of effluent reduction is wholly out of proportion to the costs of achieving such marginal level of reduction.'" *Id.* at 71 n. 10, 101 S. Ct. 295 (quoting Remarks of Senator Muskie reprinted in Legislative History of the Water Pollution Control Act Amendments of 1972 (Committee Print compiled for the Senate Committee on Public Works by the Library of Congress) Ser. No. 93-1, p. 170 (1973)). In determining BAT, by contrast, the EPA may consider cost as a factor to a limited degree, *see id.*, but only as to whether the cost of a given technology could be reasonably borne by the industry and not the relation between that technology's cost and the benefits it achieves, *Riverkeeper I*, 358 F.3d at 195.

Section 306, which governs the effluent limitations that apply to new sources, provides that a "standard of performance" established by the EPA must reflect the "best available demonstrated control technology." CWA § 306(a)(1), 33 U.S.C. § 1316(a)(1). In language identical to the text of § 304(b)(2)(B) governing BAT, Congress provided that in establishing standards of performance, the EPA "shall take into consideration

the cost of achieving such effluent reduction," CWA § 306(b)(1)(B), 33 U.S.C. § 1316(b)(1)(B), but did not require the EPA to conduct cost-benefit analysis. *Nat'l Wildlife Fed'n v. EPA*, 286 F.3d 554, 570 (D.C. Cir. 2002) ("[S]ection 306 requires that, when setting the [new source performance standards], the Administrator must take costs into consideration, but does not require that she conduct a cost-benefit analysis."). Sections 301 and 306 of the CWA thus demonstrate that, after 1989, cost is a lesser, more ancillary consideration in determining what technology the EPA should require for compliance under those sections.

The shift from the BPT standard to the more stringent BAT one clearly signaled Congress's intent to move cost considerations under the CWA from a cost-benefit analysis to a cost-effectiveness one. We understand the difference between these two analyses to turn on the difference between means and ends. Cost-benefit analysis, like BPT, compares the costs and benefits of various ends, and chooses the end with the best net benefits. By contrast, cost-effectiveness considerations, like BAT, determine which means will be used to reach a specified level of benefit that has already been established.[10] Given the above and considering the parallel language of sections 304(b)(2)(B) and 306(b)(1)(B), the reasoning of *National*

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[10] *See, e.g.*, OMB Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, Appendix A (1992) (defining "benefit-cost analysis" as "[a] systematic quantitative method of assessing the desirability of government projects or policies when it is important to take a long view of future effects and a broad view of possible side-effects" and "cost-effectiveness" as "[a] systematic quantitative method for comparing the costs of alternative means of achieving the same stream of benefits or a given objective").

Crushed Stone strongly suggests that cost-benefit analysis is no longer permitted under those sections of the CWA.

2. *Cost Analysis Pursuant to Section 316(b)*

As already noted, section 316(b) does not itself set forth the factors that the Agency can consider in determining the "best technology available for minimizing adverse environmental impact." The BTA standard of section 316(b), however, is linguistically similar to the BAT standard of section 301 and the standard that applies to new sources under section 306, and to the extent that cost-benefit analysis is precluded under those statutes, one might reasonably conclude that it is similarly not permitted under section 316(b). We conclude in any event that the language of section 316(b) itself plainly indicates that facilities must adopt the *best* technology available and that cost-benefit analysis cannot be justified in light of Congress's directive.

We stated in *Riverkeeper I* that the EPA can consider cost in establishing BTA, but only in a limited fashion and not as a primary consideration. Indeed, "[w]ith respect to costs, 'the Administrator must inquire into the initial and annual costs of applying the technology and make an affirmative determination that those costs can be *reasonably* borne by the industry.'" *Riverkeeper I*, 358 F.3d at 195 (quoting *Chem. Mfrs. Ass'n v. EPA*, 870 F.2d 177, 262 (5th Cir. 1989)) (emphasis added). While the statutory language suggests that the EPA may consider costs in determining BTA, in that a technology that cannot not be reasonably borne by the industry is not "available" in any meaningful sense, cost-benefit analysis is not similarly supported by the language or purpose of the statute. Section 316(b) expressly requires a

technology-driven result, *cf. Natural Res. Def. Council, Inc. v. EPA*, 822 F.2d 104, 123 (D.C. Cir. 1987) ("[T]he most salient characteristic of [the CWA's] statutory scheme, articulated time and again by its architects and embedded in the statutory language, is that it is technology-forcing."), not one driven by cost considerations or an assessment of the desirability of reducing adverse environmental impacts in light of the cost of doing so. A selection of BTA based on cost-benefit considerations is thus impermissibly cost-driven, but a selection based in part on cost-effectiveness considerations, while taking cost into account, remains technology-driven. The statute therefore precludes cost-benefit analysis because "Congress itself defined the basic relationship between costs and benefits." *Am. Textile Mfrs. Inst., Inc. v. Donovan*, 452 U.S. 490, 509, 101 S. Ct. 2478, 69 L.Ed.2d 185 (1981). Moreover, this conclusion is further supported by the fact that Congress in establishing BTA did not expressly permit the Agency to consider the relationship of a technology's cost to the level of reduction of adverse environmental impact it produces.[11] "When Congress has intended that an

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[11] This conclusion accords with the analysis in *Riverkeeper I* that the EPA may consider cost in establishing BTA pursuant to section 316(b), but only in a limited way. In our discussion of the EPA's choice of closed-cycle, rather than dry, cooling as BTA for Phase I facilities, *see* 358 F.3d at 194-95, 194 n. 22, we noted that "dry cooling costs more than ten times as much per year as closed-cycle wet cooling," but emphasized that "it is estimated to reduce water intake by only an additional 5 percent relative to once-through cooling." *Id.* at 194 (internal footnotes omitted). We acknowledged that dry cooling is both much more effective and much more expensive than closed-cycle cooling in absolute terms, but stressed that, as compared to the baseline of once-through cooling systems, the marginal benefits of dry cooling were small: "it is undeniably relevant that that difference represents a

agency engage in cost-benefit analysis, it has clearly indicated such intent on the face of the statute." *Id.* at 510, 101 S. Ct. 2478.

Given the above, the EPA may permissibly consider cost in two ways: (1) to determine what technology can be "reasonably borne" by the industry and (2) to engage in cost-effectiveness analysis in determining BTA. Thus, the EPA must first determine what is the most effective technology that may reasonably be borne by the industry. In making this initial determination, the most effective technology must be based not on the average Phase II facility but on the optimally best performing Phase II facilities, *see, e.g., Kennecott v. United States EPA*, 780 F.2d 445, 448 (4th Cir. 1985) ("In setting BAT, EPA uses not the average plant, but the optimally operating plant, the pilot plant which acts as a beacon to show what is possible."), although, of course, the EPA must still ascertain whether the industry as a whole can reasonably bear the cost of the adoption of the technology, bearing in mind the aspirational and technology-forcing character of the CWA. This technology constitutes the benchmark for performance. Once this determination has been made, the EPA may then consider other factors, including cost-effectiveness, to choose a less expensive technology that achieves essentially the same results as the

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relatively small improvement over closed-cycle cooling at a very significant cost." *Id.* at 194 n. 22. In dicta, we characterized this mode of analysis as "relevant" and stated that it "adds a useful perspective," *id.*, but did not treat it as the fulcrum of our analysis. Ultimately, we deferred to the EPA's determination insofar as it was based on the grounds that dry cooling was too expensive for industry reasonably to bear and that dry cooling has negative environmental effects best left to the considered judgment of the Agency. *Id.* at 195-96.

benchmark.[12] For example, assuming the EPA has determined that power plants governed by the Phase II Rule can reasonably bear the price of technology that saves between 100-105 fish, the EPA, given a choice between a technology that costs $100 to save 99-101 fish and one that costs $150 to save 100-103 fish (with all other considerations, like energy production or efficiency, being equal), could appropriately choose the cheaper technology on cost-effectiveness grounds. Cost-benefit analysis, however, is not permitted under the statute because, as noted, Congress has already specified the relationship between cost and benefits in requiring that the technology designated by the EPA be the best available.[13] *Cf. Am. Textile Mfrs. Inst.*, 452 U.S. at 509-10, 101 S. Ct. 2478. The Agency accordingly could not make the policy decision, in the face of Congress's determination that facilities use the

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[12] We note that the EPA is by no means required to engage in cost-effectiveness analysis. Indeed, to require the Agency to conduct cost-effectiveness analysis would transform such analysis into a primary factor in choosing BTA, which clearly is contrary to the technology-forcing principle that animates the CWA. Equally important, we note that the Agency may also depart from this performance benchmark because of other permissible considerations aside from cost, for instance, energy efficiency or environmental impact. *See Riverkeeper I*, 358 F.3d at 195-96 (noting "the EPA was permitted to consider ... energy efficiency in determining the 'best technology available'" and could also factor in environmental impact). While the EPA has indicated throughout the record and its briefing before us that its determination of BTA here included such considerations as energy efficiency and production concerns, we nevertheless must remand, as we explain below, for further explanation from the Agency. Accordingly, we express no view on the merits of the EPA's determination regarding the other factors it claims influenced its decision.

[13] For this reason, we reject Entergy's argument that the Rule is improper because its cost exceeds its benefits.

best technology available, that an economically feasible level of reduction of impingement mortality and entrainment is not desirable in light of its cost. Indeed, in the example above, the EPA could not choose the cheaper technology on cost considerations under section 316(b) if the EPA had first determined that the power plants could reasonably bear the cost of technology that could save at least 102 fish.

We nevertheless acknowledge that the comparable technologies considered by the Agency need not be identically effective for the Agency to engage in cost-effectiveness analysis. Were that the case, all that would be required would be the simple determination of which among competing technologies that achieved the same degree of reduction of adverse environmental impacts is the cheapest. Instead, the specified level of benefit is more properly understood as a narrowly bounded range, within which the EPA may permissibly choose between two (or more) technologies that produce essentially the same benefits but have markedly different costs. With these considerations in mind, we turn to the Rule as promulgated.

3. *The Determination of BTA under the Phase II Rule*

As noted previously, unlike the Phase I Rule, the Phase II Rule does not require facilities to reduce intake flow to a level commensurate with the intake of closed-cycle systems. Instead, the Rule requires facilities to meet the national performance standards associated with the suite of technologies the EPA identified as BTA. Petitioners' challenge here has two components. First, the state petitioners contend that closed-cycle cooling is the best technology available and that the EPA has exceeded its authority by promulgating a rule that does not require closed-cycle cooling, or the use of technologies producing a

commensurate reduction of water usage for existing facilities in the same manner as the Phase I Rule required for new facilities.[14] Second, the environmental petitioners argue that the EPA improperly rejected closed-cycle cooling as BTA for the largest facilities on the most sensitive waterbodies at the direction of OMB because it sought to maximize net economic benefits rather than to minimize adverse environmental impact. They further argue that the BTA standard of section 316(b) requires a commitment of the maximum resources economically feasible to the goal of eliminating adverse environmental impacts and that the statute does not permit the EPA to select BTA on the basis of cost-benefit analysis.

For the reasons that follow, we conclude that the statute's "best technology available" standard permits cost-effectiveness considerations to influence the choice among technologies whose performance does not essentially differ from the performance of the best-performing technology whose cost the industry reasonably can bear, but that the statute does not permit the EPA to choose BTA on the basis of cost-benefit analysis. As we explain below, however, the record is unclear as to the basis for the EPA's selection of the suite of technologies as BTA, and we therefore remand for clarification of the basis for the Agency's decision and potentially for a reassessment of BTA.

The EPA stated in the Rule's preamble that the BTA standard should be interpreted as "best technology available commercially at an economically

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[14] While the state petitioners frame their argument as a challenge to the site-specific compliance alternatives, their brief presses the view that closed-cycle cooling is the best technology available and that the EPA exceeded its authority in failing to require Phase II facilities to adopt it.

practicable cost," and explained that "an important component of economic practicability" is "the relationship of costs to environmental benefits." 69 Fed. Reg. at 41,604. The EPA further explained that this inquiry required that "there should be some reasonable relationship between the *cost* of cooling water intake structure control technology and the environmental *benefits* associated with its use." *Id.* (emphasis added).

The EPA took this "economically practicable" concept directly from the text of a floor speech of a single representative—the only specific reference to section 316(b) in the congressional debates. *See Riverkeeper I*, 358 F.3d at 186 n. 12. We noted in *Riverkeeper I* that the "paucity" of legislative history "counsels against imputing much specific intent to Congress beyond the section's words themselves." *Id.* Moreover, we find the EPA's interpretation of section 316(b) problematic because its construction significantly resembles the less stringent, and now obsolete, BPT standard of section 301(b)(1)(A). As noted earlier, in setting forth the factors for the EPA to consider in establishing BPT under section 301(b)(1)(A) and the more stringent BAT under section 301(b)(2)(A), Congress made only one distinction: while the Agency could consider the relationship between cost and benefits in establishing BPT, CWA § 304(b)(1)(B), 33 U.S.C. § 1314(b)(1)(B), it could consider cost insofar as it can be "reasonably borne" by the industry, but not the relationship between cost and benefits, in establishing BAT, CWA § 304(b)(2)(B), 33 U.S.C. § 1314(b)(2)(B). *Riverkeeper I*, 358 F.3d at 195.

This difference in how the EPA can consider cost under section 304(b) in establishing BPT and BAT is directly mirrored by the most significant textual distinction between sections 301(b)(1)(A) and

301(b)(2)(A)—the requirement that a technology be "practicable" under only the less stringent BPT standard. *Compare* CWA § 301(b)(1)(A), 33 U.S.C. § 1311(b)(1)(A) (BPT is the "best practicable control technology") *with* CWA § 301(b)(2)(A), 33 U.S.C. 1311(b)(2)(A) (BAT is the "best available technology"). The use of the word "practicable," therefore, when coupled with the permissible cost considerations under section 304, signals that Congress intended the EPA to strike a balance between cost and benefits in determining BPT. But the word "practicable" is missing from the more stringent BAT standard, under which Congress prohibited the EPA from considering the relation of cost to benefits. This omission is thus significant. *See Russello v. United States*, 464 U.S. 16, 23, 104 S. Ct. 296, 78 L.Ed.2d 17 (1983) ("[W]here Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion." (quotation marks and citation omitted; alteration in original)). Because Congress also omitted "practicable" from section 316(b), we are troubled by the Agency's interpretation of the statute to require "practicability" analysis here and its implicit corollary that the Agency can undertake a cost-benefit analysis in establishing BTA under section 316(b).

Our concern with the EPA's determination with respect to section 316(b) is further deepened by the Agency's rejection of closed-cycle cooling and selection of a suite of technologies as the basis for BTA for existing facilities because the suite of technologies were the most "cost effective" option. 69 Fed. Reg. at 41,667. The EPA explained this decision on several grounds. It first noted that it was rejecting closed-cycle cooling as BTA because of (1) "its generally high

costs (due to conversions)," (2) "the fact that other technologies approach the performance of this option," and (3) "concerns for energy impacts due to retrofitting existing facilities, and other considerations." *Id.* at 41,605. The EPA emphasized that it selected BTA based on its determination that "a national requirement to retrofit existing systems is not the most cost-effective approach and at many existing facilities, retrofits may be impossible or not economically practicable." *Id.* It further explained that its rejection of closed-cycle cooling as BTA was based on "total social costs" and "lack of cost-effectiveness," as well as "concerns regarding potential energy impacts." *Id.* at 41,606.

Given the EPA's discussion, noted above, of economically practicability, it is unclear whether the Agency improperly weighed the benefits and the costs of requiring closed-cycle cooling. Indeed, a comparison between the cost of closed-cycle cooling and the monetized benefits of this technology appears to have played some role in the EPA's rejection of this option as BTA. In the preamble to the proposed Rule, for instance, the EPA examined whether to require closed-cycle cooling on specific large bodies of waters and stated that "the incremental costs of [this closed-cycle cooling] option relative to the proposed option ($413 million) significantly outweigh the incremental benefits ($146 million)." 67 Fed. Reg. at 17,158. Other record evidence on the EPA's rejection of closed-cycle cooling as BTA is a terse EPA memorandum indicating that a requirement commensurate with closed-cycle cooling for facilities on sensitive waterbodies would cost three times as much as the option ultimately adopted by the EPA and reduce entrainment, at most, by 1.33 times that option.

Given the above indications that the EPA engaged in cost-benefit analysis, we remand for the EPA to explain its conclusions. At the outset, it is difficult to discern from the record how the EPA determined that the cost of closed-cycle cooling could not be reasonably borne by the industry.[15] Additionally, the EPA did not explain its statement that the suite of technologies "approach[es]" the performance of closed-cycle cooling. We see no adequate comparison in the Rule's proposal, the final Rule or its preamble, or the EPA's submissions to this Court of the effectiveness of closed-cycle cooling and the group of technologies whose effectiveness provided the basis for the Phase II Rule's performance standards.[16] In a technical area of this

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[15] Indeed, at one point in the Rule's proposal, the EPA mentions that requiring closed-cycle cooling at 539 existing power plants nationwide subject to the Phase II Rule would cost upwards of $2.26 billion and could close nine power plants (about 1.6% of all Phase II facilities). 67 Fed. Reg. at 17,155. There is little discussion about whether the industry could reasonably bear this burden. We note that in *Riverkeeper I*, it appears the EPA supplied the court with better data on this question, noting that of the 83 facilities subject to the Phase I Rule, dry cooling compliance costs would equal on average more than 4% of revenue for all 83 producers and more than 10% of the revenue at 12 facilities (nearly 15% of all Phase I facilities), presenting a possibly high barrier to entry for new facilities. *See Riverkeeper I*, 358 F.3d at 194. We have found no comparable data in the record, nor has the EPA cited any.

[16] Some limited evidence, however, is available in the record in intelligible form. In the Rule's proposal, the EPA noted that closed-cycle systems "generally reduce the water flow from 72 percent to 98 percent, thereby using only 2 percent to 28 percent of the water used by once-through systems." *Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities; Proposed Rule*, 67 Fed. Reg. 17,122, 17,189 (Apr. 9, 2002). The Agency went on to state that "[i]t is generally assumed that this would result in a comparable reduction in impingement and entrainment," *id.*,

sort, it is difficult for judges or interested parties to determine the propriety of the Agency's action without a justification for the action supported by clearly identified substantial evidence whose import is explained. The record evidence alone here, which consists in large part of a voluminous database compilation of studies that assess the efficacy of various technologies at different locations, is oblique, complicated, and insufficient to permit us to determine what the EPA relied upon in reaching its conclusion. As the Supreme Court has emphasized, "[o]ur

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indicating that closed-cycle systems reduce the adverse impacts of impingement and entrainment by 72 to 98 percent. In a technical development document ("TDD") for the proposal, however, the EPA disaggregated these data, stating that closed-cycle cooling systems use 96 to 98 percent less *fresh* water and 70 to 96 percent less *salt* water than once-through systems. TDD for the Proposed § 316(b) Phase II Existing Facilities Rule 4-1; *see also Riverkeeper I*, 358 F.3d at 194 n. 22 ("[C]losed-cycle wet cooling systems use 96 to 98 percent less fresh water (and 70 to 96 percent less salt water) than similarly situated once-through systems." (citing 66 Fed. Reg. at 65,273)). The EPA's analysis in its proposal suggests that the disaggregated data indicate that closed-cycle cooling would reduce impingement mortality and entrainment by 96 to 98 percent at facilities that use fresh water and by 70 to 96 percent at facilities that use salt water. A 72 to 98 percent reduction of impingement mortality and entrainment, and the corresponding disaggregated percent reductions for facilities using salt and fresh water, differs from the Phase II requirement that facilities reduce impingement mortality by 80 to 95 percent and entrainment by 60 to 90 percent. These differences seem potentially significant, especially in determining whether this suite of BTA technologies achieve essentially the same result as closed-cycle cooling, but are neither explained nor adequately compared for purposes of our review here. For instance, there does not appear to be any discussion regarding the seemingly large differences in the rates of impingement and entrainment reduction between closed-cycle cooling and the Phase II national performance standards.

recognition of Congress' need to vest administrative agencies with ample power to assist in the difficult task of governing a vast and complex industrial Nation carries with it the correlative responsibility of the agency to explain the rationale and factual basis for its decision, even though we show respect for the agency's judgment in both." *Bowen v. Am. Hosp. Ass'n*, 476 U.S. 610, 627, 106 S. Ct. 2101, 90 L.Ed.2d 584 (1986) (plurality opinion).

The EPA was required to explain its judgment and the basis for it. Because the EPA purported to base its decision in large part on cost-effectiveness considerations, it was required to identify and explain any evidence indicating a minimal performance difference between comparable technologies, but it did not do so here. It stated only that the performance of the technologies it identified as BTA "approach" the performance of closed-cycle cooling.[17]

We therefore find it impossible to judge whether the performance of these technologies is essentially the same as the performance of closed-cycle cooling, or whether they simply are cheaper per percentage point of reduction in entrainment and impingement mortality. That is, on the record before us, it is impossible to tell whether the EPA based its decision on permissible cost-effectiveness analysis or exceeded its authority by relying impermissibly upon a cost-benefit analysis. To the extent that the record does not indicate the EPA's basis, however, its statement that

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[17] The Agency, however, did provide some indication of the relative *costs* of closed-cycle cooling and the suite of technologies identified as BTA. The EPA stated in the preamble to the Rule that the "total social cost" of closed-cycle cooling would be "$3.5 billion per year," 69 Fed. Reg. at 41,605, and that the "final rule will have total annualized social (pre-tax) costs of $389 million," *id.* at 41,650.

"the relationship of costs to environmental benefits is an important component of economic practicability," 69 Fed. Reg. at 41,604, indicates that cost-benefit analysis, under the cover of considerations of "practicability," was central to the Agency's decisionmaking.

In short, the EPA's failure to explain its decision frustrates effective judicial review. If the EPA construed the statute to permit cost-benefit analysis, its action was not "based on a permissible construction of the statute." *Chevron*, 467 U.S. at 843, 104 S. Ct. 2778. It may also be that the EPA misunderstood or misapplied cost-effectiveness analysis. If so, its decision was arbitrary and capricious because the Agency relied on factors Congress has not intended it to consider. *See Waterkeeper Alliance*, 399 F.3d at 498. Finally, the EPA may have simply failed either to perform the required analysis or to explain adequately a decision that was within its authority to make. We cannot opine on this subject, because we must consider only those justifications that the EPA offered at the time of the rulemaking. *See SEC v. Chenery*, 318 U.S. 80, 87-88, 63 S. Ct. 454, 87 L.Ed. 626 (1943). Moreover, while the EPA could rely on factors other than impingement and entrainment in establishing BTA, such as negative environmental impacts or concerns about energy production and efficiency, *see Riverkeeper I*, 358 F.3d at 195-96, we are unable to determine, on the record before us, whether the EPA gave paramount consideration to an improper factor in determining BTA. We therefore remand for clarification of the basis for the Agency's action and possibly for a new determination of BTA.[18]

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[18] As previously noted, the environmental petitioners, supported by amicus curiae OMB Watch, have challenged the EPA's decision to reject closed-cycle cooling as BTA for 59

4. *Performance Standards Expressed as Ranges*

The Phase II Rule establishes performance standards expressed as an 80 to 95 percent reduction in impingement mortality and a 60 to 90 percent reduction in entrainment, which existing power plants must achieve, subject to certain exceptions, in order to be considered in compliance with the Rule. 40 C.F.R. § 125.94(b)(1), (2). The environmental petitioners challenge the Rule's "wide and indeterminate ranges" as failing to constitute "precise single-level limitations based on the best technology available for minimizing adverse environmental impact" and argue that these ranges are inconsistent with Congress's intent that there be a national standard under section 316(b). We agree in part and, because the EPA in reconsidering its selection of BTA on remand may alter the suite of technologies it originally selected, thereby causing a coordinate alteration in the performance ranges, we provide some guidance to the EPA insofar as the petitioners' challenge touches on the limits of the Agency's authority. Although the EPA may, in the

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facilities on the most sensitive waterbodies in part because of OMB's participation in the rulemaking process. They contend that the EPA's action is not entitled to deference because the EPA was improperly influenced by OMB in promulgating this aspect of the Phase II Rule. The petitioners and the EPA have also sought either to strike from the record or to supplement the record with certain OMB review documents. Because we have granted the petitioners' challenge to the EPA's determination of BTA without considering OMB's role in interagency review, we do not reach the petitioner's arguments regarding OMB's involvement in the rulemaking and deny the motions to strike and to supplement as moot. *See Waterkeeper Alliance*, 399 F.3d at 524 n. 34 (denying petitioners' motion to supplement the record with OMB review documents as moot where the Court granted the petitions without considering the OMB review documents).

circumstances to be discussed, set performance standards as ranges, it must require facilities to minimize the adverse environmental impacts attributable to their cooling water intake structures to the best degree they can.

The petitioners note that the EPA has found that certain screens and filter systems can reduce impingement mortality by up to 99 percent and that similar technologies can produce 80 to 90 percent reduction in entrainment. 69 Fed. Reg. at 41,599. They contend that the CWA therefore requires the EPA to set BTA standards reflecting these best performers, *see Texas Oil & Gas Ass'n v. EPA*, 161 F.3d 923, 928 (5th Cir. 1998) ("Congress intended these [BAT] limitations to be based on the performance of the single best-performing plant in an industrial field." (citation and internal quotation marks omitted)), particularly given the EPA's acknowledgment that "[t]he higher end of the range is a percent reduction that available data show many facilities can and have achieved with the available technologies upon which the performance standards are based." 69 Fed. Reg. at 41,600. The petitioners emphasize that the Rule's ranges impermissibly fail to require facilities even to attempt to achieve performance equal to the upper bound of the prescribed ranges.

According to the EPA, section 316(b) does not require a single-numeric standard applicable to all Phase II existing facilities, and expressing the performance standards as ranges is necessary to account for the variables involved in reducing impingement mortality and entrainment under local conditions at particular facilities. The EPA contends that "[b]ecause the Phase II requirements are applied in a variety of settings and to existing facilities of different types and sizes, no single technology is most

effective for all facilities subject to the Rule." The Agency argues that the technologies do not provide a fixed level of performance at all facilities and that their performance is affected by the nature of the waterbody, facility intake requirements, climatic conditions, and the waterbody's biology. The EPA argues also that the permit process requires facilities to reduce impingement mortality and entrainment commensurate with the efficacy of the installed technologies, which it claims ensures that the installed technologies will be maintained to ensure their utmost efficacy.[19] The difficulty with the EPA's arguments is that the Rule does not require facilities to choose technologies that produce the greatest reduction possible.

Our decision in *Riverkeeper I* sheds some light on the parties' arguments. In that case, we discussed the differences between the two tracks in the Phase I Rule: Track I set forth precise velocity and capacity requirements while Track II permitted compliance via technologies that would achieve at least 90 percent of the reduction in impingement mortality and entrainment that compliance with Track I would yield. *See* 358 F.3d at 182-83. The petitioners in that case challenged the Track II provision on the ground that it deviated from the statutory requirement that the EPA establish a single level of performance applicable to all facilities. *Id.* at 187. The EPA argued that Tracks I and II reflected the same standard and that 10 percent is an acceptable margin of error given that

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[19] The specific provision requires that when a facility's permit expires, any reissued permit must contain a requirement that "the facility ... reduce impingement mortality and entrainment ... commensurate with the efficacy at the facility of the installed design and construction technologies, operational measures, and/or restoration measures." 40 C.F.R. § 125.98(b)(1)(iii).

measurements of reduction of impingement mortality and entrainment are necessarily inexact and depend upon natural fluctuations in animal populations and sampling errors. *Id.* at 188. In assessing the parties' arguments, we stated that "the EPA, consistent with Congress's intention that there be a national standard governing the discharge of pollutants, must promulgate *precise effluent limitations* under sections 301 and 306 ...." *Id.* (emphasis added). We went on to note, however, that while pollutant concentration and the velocity and volume of water withdrawn can be measured accurately, impingement mortality and entrainment "cannot always be measured directly and with mathematical precision." *Id.* at 189. We concluded that the EPA acted reasonably in specifying "how much ambiguity it is willing to tolerate in measuring compliance and what it considers a reasonable margin of error in comparing the performance of different technologies." *Id.* In short, we acknowledged that the Track II performance requirements, unlike the Track I requirements, could not be measured precisely and that it was therefore reasonable to consider a margin of error in comparing performance under the two standards.

This case is not entirely similar to *Riverkeeper I* because of the rationales that animate the EPA's creation of the performance ranges in Phases I and II. The Phase II Rule generally require facilities to reduce impingement mortality and entrainment by the specified percent ranges from the calculation baseline. 40 C.F.R. § 125.94(b). These ranges, as explained by the EPA, are based on the reductions achievable by using various technologies. *See* 69 Fed. Reg. at 41,599. The EPA explained that it expressed the performance standards "in the form of ranges rather than a single performance benchmark because of the uncertainty

inherent in predicting the efficacy of any one of these technologies." *Id.* at 41,600. It stated further that the lower end of the range is the percent reduction it "expects all facilities could eventually achieve if they were to implement and optimize available design and construction technologies and operational measures on which the performance standards are based" and that the higher end of the range "is a percent reduction that available data show many facilities can and have achieved with the available technologies upon which the performance standards are based." *Id.* Unlike *Riverkeeper I*, therefore, a margin of error from a relatively precise benchmark that is tolerable given measurement difficulties is not at issue here. Instead, the performance standards reflect the range of performance associated with various technologies identified as BTA. That performance, in turn, depends in part on local conditions and natural fluctuations. *Id.*

Record evidence supports the EPA's conclusion that the percent reduction of impingement mortality and entrainment is not completely within the control of a facility and therefore may not be precisely achieved by a facility. *See* TDD for the Final § 316(b) Phase II Existing Facilities Rule 4-3. Reducing these adverse environmental impacts is not as easily measured and controlled as are the discharge of pollutants and the capacity and flow rate of water intake.[20] We therefore

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[20] Nothing in *Hooker Chems. & Plastics Corp. v. Train*, 537 F.2d 620 (2d Cir. 1976), suggests the contrary. While we did announce in that case that performance ranges did not comport with the effluent limitations established by the CWA, *id.* at 630, the discharge limitations at issue there were easily measured, unlike the reductions in impingement and entrainment at issue in both this case and *Riverkeeper I*, which "cannot always be measured directly and with mathematical precision," *Riverkeeper I*, 358 F.3d at 189.

acknowledge that in many cases it may be difficult, as a practical matter, for the EPA or other permitting authority to predict which plants will be able to achieve the upper, as opposed to the lower, end of the ranges. This uncertainty, however, does not justify a rule that permits even those facilities that could achieve the upper end of a range to be deemed in compliance if they reach only the lower end, particularly when the EPA has acknowledged that many facilities "can and have" achieved reductions at the high end of the range. 69 Fed. Reg. at 41,600. Congress's use of the superlative "best" in the statute cannot be read to mean that a facility that achieves the lower end of the ranges, but could do better, has complied with the law. The statutory directive requiring facilities to adopt the *best* technology cannot be construed to permit a facility to take measures that produce second-best results, *see Chevron*, 467 U.S. at 843, 104 S. Ct. 2778, especially given the technology-forcing imperative behind the Act, *Natural Res. Def. Council*, 822 F.2d at 123. Insofar as the EPA establishes performance standards instead of requiring facilities to adopt particular technologies, it must require facilities to choose the technology that permits them to achieve as much reduction of adverse environmental impacts as is technologically possible.[21] For this reason, the EPA on

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[21] Although it may be difficult to know *ex ante* which plants can achieve the upper end of the range, this is at least in part because the technologies preferred by the EPA are somewhat new and untested. In future permitting cycles, permitting authorities will be likely to have a clearer notion of which facilities can feasibly achieve the upper end of the range.

Finally, the upper end of the range established by the EPA, should it retain this provision on remand, should not be set at a level that many facilities "have achieved" with the installation of one or more of the technologies determined to be BTA but, as we noted earlier, at the best possible level of impingement and

remand should address these concerns if in its BTA determination, it retains performance ranges.

B. *Restoration Measures*

The Phase II Rule allows a facility to meet the national performance standards set forth in 40 C.F.R. § 125.94(b) through the use of restoration measures such as restocking fish killed by a cooling water system and improving the habitat surrounding the intake structure in order, as the EPA explains, "to provide additional flexibility to facilities in complying with the rule by eliminating or significantly offsetting the adverse environmental impact caused by the operation of a cooling water intake structure." 69 Fed. Reg. at 41,609; 40 C.F.R. § 125.94(c). The state and environmental petitioners contend that the EPA exceeded its authority by allowing compliance with section 316(b) through restoration measures because

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entrainment reduction the EPA determines these technologies can achieve. *See, e.g., Kennecott*, 780 F.2d at 448 ("In setting BAT, EPA uses not the average plant, but the optimally operating plant, the pilot plant which acts as a beacon to show what is possible."). If, at a particular Phase II facility, the adoption of BTA technologies can achieve a 95% reduction in entrainment and impingement, it is unclear why, under our jurisprudence and the clear dictates of the CWA, the EPA could establish a performance standard that has placed the ceiling at the 90% threshold which "many" Phase II facilities "can and have" achieved with the same technology. *See Am. Iron & Steel Institute v. EPA*, 526 F.2d 1027, 1051 (3d Cir. 1975) ("It will be sufficient, for the purpose of setting the level of control under available technology, that there be one operating facility which demonstrates that the level can be achieved.") (internal quotation marks and citations omitted). This would not require every Phase II facility to meet the upper end of the ranges, but only that each Phase II facility achieve the highest reduction it can with the installation of technologies determined by the EPA to be BTA. The performance ranges, if retained on remand, should accordingly reflect this understanding.

Riverkeeper I held that the statute's meaning is plain and that restoration measures cannot substitute for the "best technology available for minimizing adverse environmental impact" in cooling water intake structures. The EPA contends that its interpretation of the statute to permit restoration measures as a means of compliance is entitled to deference because it defined certain statutory terms in the Phase II Rule that it had not defined in the Phase I Rule. The EPA also relies on the Supreme Court's holding in *National Cable & Telecommunications Association v. Brand X Internet Services*, 545 U.S. 967, 125 S. Ct. 2688, 162 L.Ed.2d 820 (2005), and our statement in *Riverkeeper I* limiting the decision's reach to the Phase I Rule, to argue that our prior interpretation of the statute does not trump the Agency's construction. We agree with the petitioners that *Riverkeeper I* held that the Agency's decision to permit restoration measures in the Phase I Rule was not "based on a permissible construction of the statute," *Chevron*, 467 U.S. at 843, 104 S. Ct. 2778, and that this holding applies equally here.

We began *Riverkeeper I* by noting that we were remanding the Phase I restoration provision because it "contradicts Congress's clearly expressed intent." 358 F.3d at 181. We went on to state that "however beneficial to the environment, [restoration measures] have nothing to do with the location, the design, the construction, or the capacity of cooling water intake structures, because they are unrelated to the structures themselves." *Id.* at 189. "Restoration measures *correct* for the adverse environmental impacts of impingement and entrainment," we noted, but "they do not *minimize* those impacts in the first place." *Id.* (emphasis added). For this reason and others, we concluded in *Riverkeeper I* that the EPA

had exceeded its authority in promulgating the Phase I Rule by allowing compliance with section 316(b) through restoration measures because this Rule was "plainly inconsistent" with the statute's text and Congress's intent. *Id.* at 189, 191.

The EPA's argument that *Riverkeeper I* is not binding on this issue here has three components. First, the EPA contends that our rejection of the restoration measures at issue in *Riverkeeper I* did not turn on the statute's text, but instead was based on various other indicators of Congressional intent. The Agency makes much of *Riverkeeper I*'s brief discussion of Congress's rejection of a proposed amendment to section 316(b) that would have explicitly allowed restoration measures and of the EPA's support of that amendment because in its opinion, the existing language did not authorize restoration measures. *Id.* at 190-91. Second, the EPA argues that its interpretation of section 316(b) in the Phase II Rule is entitled to deference because the Rule defined certain statutory terms it had not defined in the previous rulemaking phase and that its reasonable interpretation of these terms is entitled to deference. Specifically, the Agency "defined" three statutory terms in the preamble: it (1) read the phrase "minimiz[e] adverse environmental impact" to let facilities "minimize adverse environmental impact by reducing impingement and entrainment, or to minimize adverse environmental impact by compensating for those impacts after the fact," 69 Fed. Reg. at 41,628; (2) interpreted "reflect" to authorize it to consider the full range of technologies, including restoration measures, that minimize adverse environmental impact; and (3) viewed "restoration measures as part of the 'design' of a cooling water intake structure," and "one of several technologies that may be employed ... to minimize adverse environmental impact," 69 Fed. Reg. at 41,637.

Finally, the EPA relies on our statement in *Riverkeeper I* that our ruling on the Phase I Rule was not meant to "predetermine the factors and standard[s] applicable to Phases II and III of the rulemaking," 358 F.3d at 186 n. 13, and on the Supreme Court's holding in *Brand X* that "[a] court's prior judicial construction of a statute trumps an agency construction otherwise entitled to *Chevron* deference only if the prior court decision holds that its construction follows from the unambiguous terms of the statute and thus leaves no room for agency discretion." 545 U.S. at 982, 125 S. Ct. at 2700.

We reject each of the EPA's contentions. First, our primary conclusion in *Riverkeeper I* was that restoration measures are "plainly inconsistent" with the statute's text, 358 F.3d at 189, and our statements regarding the legislative history of a proposed amendment, which we offered as ancillary, but not dispositive, support for our construction of the statute, in no way diminish the force of our conclusion that Congress unambiguously expressed its intent in the statute. *See Chevron*, 467 U.S. at 842-43, 104 S. Ct. 2778 ("If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress."). Second, as to the EPA's claim that its construction of the statute is entitled to deference because it has now interpreted certain statutory terms, our holding in *Riverkeeper I* was and remains clear: restoration measures contradict the unambiguous language of section 316(b). The EPA's promulgation of the Phase II Rule obviously did nothing to alter the text of section 316(b), and the Agency cannot create ambiguity where none otherwise exists by defining statutory terms contrary to their plain meaning. Finally, as the foregoing analysis suggests, our decision

in *Riverkeeper I* foreclosed the EPA from interpreting section 316(b) in the Phase II Rule to permit restoration measures as a means of complying with the statute, and, therefore, nothing in *Brand X* undermines the precedential value of our prior holding. Our statement in *Riverkeeper I* that we did not "mean to predetermine the factors and standard applicable to Phases II and III of the rulemaking," was made in the narrow context of identifying "one reasonable reading" of particular statutory language relating to the standard for new and existing sources, not the restoration measures. 358 F.3d at 186 n. 13. Where we held that the statutory language is unambiguous, *Riverkeeper I* is binding.

Even assuming arguendo that we did not consider ourselves bound by *Riverkeeper I*, we are persuaded by its reasoning as applied here. Restoration measures are not part of the location, design, construction, or capacity of cooling water intake structures, *Riverkeeper I*, 358 F.3d at 189, and a rule permitting compliance with the statute through restoration measures allows facilities to avoid adopting *any* cooling water intake structure technology at all, in contravention of the Act's clear language as well as its technology-forcing principle. As we noted in *Riverkeeper I*, restoration measures substitute after-the-fact compensation for adverse environmental impacts that have already occurred for the minimization of those impacts in the first instance. *Id.* The Agency's attempt to define the word "minimize" to include "compensati[on] ... after the fact," 69 Fed. Reg. at 41,628, is simply inconsistent with that word's dictionary definition: "to reduce to the smallest possible extent," Webster's Third New Int'l Dictionary 1438 (1986).

Accordingly, the EPA impermissibly construed the statute by allowing compliance with section 316(b) via restoration measures, and we remand that aspect of the Rule

C. *Site-Specific Compliance Alternatives*

As noted earlier, the Phase II Rule includes two site-specific compliance alternatives or variances from the generally applicable requirements. The cost-cost alternative authorizes a site-specific determination that "data specific to [a] facility demonstrate that the costs of compliance under ... this section would be significantly greater than the costs considered by the Administrator ... in establishing the applicable performance standards," 40 C.F.R. § 125.94(a)(5)(i), while the cost-benefit alternative authorizes a site-specific determination that "data specific to [a] facility demonstrate that the costs of compliance under ... this section would be significantly greater than the benefits of complying with the applicable performance standards." *Id.* § 125.94(a)(5)(ii). If a facility makes either showing, the permitting authority "must make a site-specific determination of the best technology available" and impose "site-specific alternative requirements" that are "as close as practicable to the applicable performance standards." *Id.* § 125.94(a)(5)(i), (ii).

Petitioners challenge the cost-cost compliance alternative because, *inter alia*, they claim as a threshold matter that the Agency failed to comply with the APA's notice and comment requirements by disclosing cost data for specific facilities that would be used in determining whether a facility qualifies for the cost-cost compliance alternative only at the time the final Rule was issued. Petitioners also challenge the cost-benefit compliance alternative on two substantive grounds. They contend that this alternative (1)

impermissibly allows compliance with the statute to be based on cost-benefit analysis and (2) is analogous to a water-quality standard, which the Act permits only for thermal pollution. CWA § 316(a), 33 U.S.C. § 1326(a). We address each of these arguments in turn.[22]

1. *Cost-Cost Compliance Alternative*

As already noted, a variance may be available to a facility pursuant to 40 C.F.R. § 125.94(a)(5)(i) if the facility's compliance costs would be "significantly greater than" the costs considered by the Agency "in

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[22] Section 316(b) does not specifically authorize the Agency to allow variances from generally applicable requirements. In *Riverkeeper I*, we accepted the argument that the EPA can allow variances even in the absence of explicit statutory authority. 358 F.3d at 193. Although the statutes to which section 316(b) refers contained variance provisions, we did not read them to require that section 316(b) permit (or by its silence prohibit) variances. Instead, we stated that

> [s]ection 316(b)'s silence with respect to variances does not ... equal an unambiguous prohibition. In the absence of such a statutory bar, we think, consistent with precedent, that it is reasonable for the EPA to allow variances from regulations promulgated pursuant to section 316(b), for a regulatory system which allows flexibility, and a lessening of firm proscriptions in a proper case, can lend strength to the system as a whole.

Id. at 193 (citation and internal quotation marks omitted).

Riverkeeper I thus rejected the view that the EPA's authority to grant a variance from the generally applicable requirements of a rule promulgated pursuant to section 316(b) derives from the statutory variance provisions in other sections of the Act. Instead, *Riverkeeper I* found that the variance provision would not be authorized if it left alternative requirements to the Agency's "unfettered discretion" but would be authorized if it "guide[d] the permitting authority to consider appropriate factors and allow[ed] relaxation of the Rule's uniform technology requirements only insofar as necessary to account for unusual circumstances not considered by the Agency during its rulemaking." *Id.* at 193-94 (internal quotation marks omitted).

establishing the applicable performance standards." This variance requires a calculation of compliance costs based on the suite of BTA technologies that the EPA has identified and promulgated in the final Rule. 69 Fed. Reg. at 41,644-46. We remand this provision because (1) the EPA did not give interested parties the requisite notice and opportunity to challenge the variance by failing to identify cost data for actual, named facilities, as opposed to model facilities, until after the notice and comment period had ended, *Sprint Corp.*, 315 F.3d at 371, and (2) the variance is expressly premised on the validity of the BTA determination,[23] which itself has been remanded for further explanation, *see, e.g.*, *Solite Corp. v. U.S. EPA*, 952 F.2d 473, 494-95 (D.C. Cir. 1991) (remanding rule where the underlying grounds for its promulgation had been remanded to the EPA for procedural defects); *cf. Chenery*, 318 U.S. at 87-88, 63 S. Ct. 454 (a rule may only be upheld on the grounds that the agency proffers).

In the Rule's proposal, the EPA indicated that it had estimated compliance costs for 539 "model plants" based on factors such as "fuel source, mode of electricity generation, existing intake technologies, waterbody type, geographic location, and intake flow." 67 Fed. Reg. at 17,144. An accompanying technical development document set forth the Agency's cost calculation methodology for these model plants and listed the compliance cost estimates for each of the 539 model plants. The proposal indicated that a facility

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[23] This variance requires a comparison between the actual costs of compliance and those contemplated by EPA under the Rule. Because the Agency has calculated the costs it believes specific facilities will incur in adopting the appropriate BTA technologies (as currently defined) and then promulgated these costs in the final Rule, any change in the selection of BTA on remand will necessarily alter these costs.

must "determine which model plant [it] most closely" resembles in order to identify the costs considered by the Agency in establishing the national performance standards. *See id.* The EPA subsequently published in the Federal Register a so-called Notice of Data Availability ("NODA") in which it explained that it had changed its methodology for estimating the model plants' compliance costs. *Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities; Notice of Data Availability; Proposed Rule*, 68 Fed. Reg. 13,522, 13,527 (Mar. 19, 2003). Accompanying documents explained in greater detail the costing methodology and cost data underlying the revised approach. The revised proposal, however, did not depart from the "model plant" approach. The final Rule, by contrast, assigned cost estimates to specific, named facilities rather than model facilities. 69 Fed. Reg. at 41,670-82. The Agency explained in the preamble to the final Rule that the EPA will adjust facility-specific costs pursuant to a multiple-step calculation formula to arrive at a final estimated cost the EPA considers a comparison for purposes of the cost-cost variance. *Id.* at 41,644-47.

The EPA acknowledges that it did not disclose in the proposal or the NODA specific facility names in connection with cost data and explains that it failed to do so because it needed to protect certain confidential business information ("CBI") and had not developed during the proposal stage a means to protect that information while still providing cost data to the public. We accept the EPA's argument that masking the facility names did not prevent interested parties from commenting on the methodology and general cost data underlying the EPA's approach because the NODA explained the costing methodology and because the general cost data, while not identified by the Agency as

relating to actual, specific facilities, was made available to interested parties. *Nat'l Wildlife Fed.*, 286 F.3d at 564-65 (holding that the EPA cannot be faulted for lack of notice in not releasing CBI data). We are persuaded, however, that the release of information and request for comments on the EPA's new approach to developing compliance cost modules via the NODA did not afford adequate notice of the costs associated with specific facilities promulgated in the final Rule.

We have previously stated that "[n]otice is said not only to improve the quality of rulemaking through exposure of a proposed rule to comment, but also to provide fairness to interested parties and to enhance judicial review by the development of a record through the commentary process." *Nat'l Black Media Coalition v. FCC*, 791 F.2d 1016, 1022 (2d Cir. 1986).

"While a final rule need not be an exact replica of the rule proposed in the Notice, the final rule must be a 'logical outgrowth' of the rule proposed." *Id.* "The test that has been set forth is whether the agency's notice would fairly apprise interested persons of the subjects and issues" of the rulemaking. *Id.* (citation and internal quotation marks omitted).[24] Agencies accordingly are not permitted "to use the rulemaking process to pull a

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[24] The D.C. Circuit has phrased the test somewhat differently, stating that "[w]hether the 'logical outgrowth' test is satisfied depends on whether the affected party 'should have anticipated' the agency's final course in light of the initial notice." *Covad Comms. Co. v. FCC*, 450 F.3d 528, 548 (D.C. Cir. 2006) (citation omitted). It has also indicated that "[t]he 'logical outgrowth' doctrine does not extend to a final rule that finds no roots in the agency's proposal because something is not a logical outgrowth of nothing, nor does it apply where interested parties would have had to divine the agency's unspoken thoughts because the final rule was surprisingly distant from the Agency's proposal." *Envtl. Integrity Project v. EPA*, 425 F.3d 992, 996 (D.C. Cir. 2005) (citations, internal quotation marks, and alteration omitted).

surprise switcheroo." *Envtl. Integrity Project*, 425 F.3d at 996.

Here, only the final Rule identified facilities by name in estimating compliance costs. Interested parties therefore could not comment on the basis for particular facilities' cost figures that the EPA established. This is problematic because the availability of a variance turns on the relationship between the costs estimated in the Rule and those that a specific facility establishes in a permit proceeding. The EPA focuses on the notice it gave of its intended methodology for calculating the costs the Agency considered, but ignores the overriding importance of the cost estimates for a particular facility in determining whether a *site-specific* cost-cost variance is appropriate. Thus, the EPA should have afforded notice and an opportunity to challenge the cost estimates for specific facilities and not simply an opportunity to comment on the EPA's methodology and general cost data.[25] We remand this variance for

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[25] Because we remand on this procedural ground, we do not consider the provision on the merits. We presume that after comment on remand, however, the EPA will reevaluate the merits of the cost-cost variance provision, particularly in light of any reevaluation of BTA in which the Agency may engage. While we do not decide the issue here, we note our discomfort with the "significantly greater than" standard of 40 C.F.R. § 125.94(a)(5)(i), given the historical applicability of a "wholly disproportionate to" standard and the use of the latter standard in the Phase I Rule. We have not found entirely persuasive the EPA's position that

> [t]his difference in standards for new and existing facilities is based on (1) the greater flexibility available to new facilities for selecting the location of their intakes and installing technologies at lower costs relative to the costs associated with retrofitting existing facilities and (2) the desire to avoid economically impracticable impacts on energy prices, production costs, and energy

inadequate notice and because of our remand of the BTA determination.

2. *Cost-Benefit Compliance Alternative*[26]

If a facility requests that it be permitted to demonstrate compliance with the Phase II Rule through the site-specific cost-benefit provision of 40 C.F.R. § 125.94(a)(5)(ii), the facility must submit with its application a Comprehensive Cost Evaluation Study, Benefits Valuation Study, and Site Specific Technology Plan. 40 C.F.R. § 125.95(b)(6). As part of the Benefits Valuation Study, the facility must indicate the monetized value of commercial, recreational, and ecological benefits of compliance with the generally applicable national performance standards as well as a qualitative assessment of any so-called "non-use" benefits that cannot be monetized. 40 C.F.R. § 125.95(b)(6)(ii)(A), (E). Ultimately, the facility must demonstrate that its compliance costs are "significantly greater than" the benefits of compliance. The petitioners contend that this alternative impermissibly focuses on cost-benefit considerations, contrary to

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production that could occur if large numbers of Phase II existing facilities incurred costs that were more than "significantly greater" than but not "wholly out of proportion" to the costs in EPA's record.

68 Fed. Reg. at 13,541. The EPA would presumably consider each of these two factors in establishing BTA for existing facilities, and need not further consider them in determining whether a particular facility warrants a variance from the generally applicable BTA. Because cost is not supposed to be a paramount consideration in determining BTA, *see Riverkeeper I*, 358 F.3d at 185, the "significantly greater than" standard poses substantial concerns.

[26] In contrast to the cost-cost variance, the cost-benefit compliance alternative will not change on remand for the reconsideration of BTA. We thus reach the merits here.

Congress's directive, and is analogous to the kind of water-quality-based standard we found to be inconsistent with the statute in *Riverkeeper I*. 358 F.3d at 190. For both reasons, we are persuaded that the EPA exceeded its authority in permitting site-specific cost-benefit variances. In light of this conclusion, we do not reach the industry petitioners' claim that the provision impermissibly requires consideration of qualitative non-use benefits in the cost-benefit analysis.

As we discussed previously in analyzing the EPA's determination of BTA, cost-benefit analysis is not consistent with the requirement of § 316(b) that cooling water intake structures "reflect the best technology available for minimizing adverse environmental impact." Indeed, the statutory language requires that the EPA's selection of BTA be driven by technology, not cost. The Agency is therefore precluded from undertaking such cost-benefit analysis because the BTA standard represents Congress's conclusion that the costs imposed on industry in adopting the best cooling water intake structure technology available (*i.e.*, the best-performing technology that can be reasonably borne by the industry) are worth the benefits in reducing adverse environmental impacts. *Cf. Am. Textile Mfrs. Inst.*, 452 U.S. at 509, 101 S. Ct. 2478 (noting that where Congress has defined the basic relationship between costs and benefits, a regulatory standard that strikes a different balance is inconsistent with the statute). Just as the Agency cannot determine BTA on the basis of cost-benefit analysis, it cannot authorize site-specific determinations of BTA based on cost-benefit analysis.

The cost-benefit variance also impermissibly authorizes the EPA to consider the degraded quality of waterways in selecting a site-specific BTA. We stated

in *Riverkeeper I* that in enacting the CWA, Congress rejected regulation by reference to water quality standards. 358 F.3d at 189-90. Before 1972, Congress "regulated point sources based on their effect on the surrounding water and allowed sources to discharge pollutants provided the discharge did not cause water quality to dip below an acceptable level." *Id.* at 189. Congress changed its approach in 1972, in part because a plaintiff attempting to prove a violation of the law faced a nearly impossible burden of showing that a particular polluter had caused the water quality to dip below the regulatory standards. *Id.* at 189-90. The Act now regulates discharges from point sources rather than water quality. We thus concluded in *Riverkeeper I* that water-quality standards cannot be considered under section 316(b). *Id.* at 190. Of course, "water quality" in the context of the Act is generally understood to refer to pollutant concentration. As we noted in *Riverkeeper I*, however, for purposes of section 316(b), which regulates water intake rather than the discharge of pollutants, water quality is "measured by wildlife levels." *Id.* at 189. This analysis in *Riverkeeper I* is, thus, equally applicable here.[27]

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[27] As the petitioners note, section 316(a) permits consideration of the quality of the receiving water for purposes of granting variances with respect to the rules concerning thermal pollution. Section 316(a) provides that the Administrator may issue a variance to the rules governing "thermal discharges" to a facility that establishes that those rules "require effluent limitations more stringent than necessary to assure the pro[t]ection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made." CWA § 316(a), 33 U.S.C. § 1326(a). As the petitioners also note, section 316(b) does not similarly permit consideration of the quality of the receiving water, and this distinction is significant. *See Russello*, 464 U.S. at 23, 104 S. Ct. 296. Moreover, as we discussed in *Riverkeeper I*, the heat-

The challenged provision of the Phase II Rule apparently would permit a facility to argue that, based on water quality (*i.e.*, the level of aquatic wildlife in a particular body of water), the cost of complying with the national performance standards is not justified. The Agency explained in the preamble to the Rule that "in a waterbody that is already degraded, very few aquatic organisms may be subject to impingement or entrainment, and the costs of retrofitting an existing cooling water intake structure may be significantly greater than the benefits of doing so." 69 Fed. Reg. at 41,604. This kind of water-quality-based regulation is not authorized by the CWA because it would exempt facilities from meeting the mandated performance standards simply because wildlife levels in the waterbody were already low, and as we held in *Riverkeeper I*, the CWA does not permit the EPA to consider water quality in making BTA determinations. Finally, we note that to the extent that facilities on highly degraded waterbodies with relatively low wildlife levels face high compliance costs to achieve the national performance standards, those facilities may qualify for the cost-cost variance if such variance is retained on remand.

Because the EPA exceeded its authority under section 316(b) by permitting (1) cost-benefit analysis and (2) assessment of the quality of the receiving water (i.e., the receiving water's wildlife levels) in determining whether a variance is warranted, we do

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pollution provision of section 316(a) is a "notable exception" to the CWA, which "otherwise relies on limitations on what a source can put into the water, not the ultimate effect of that discharge." 358 F.3d at 190. Nothing in the statute, therefore, supports the view that the EPA can consider the quality of the receiving water in granting variances from generally applicable rules promulgated pursuant to section 316(b).

not need to defer to the Agency's construction of the statute. We therefore remand this aspect of the Rule.

D. *TIOP Provision*

The Phase II Rule's TIOP provision, 40 C.F.R. § 125.94(d), permits a facility to comply with the national performance standards determined on the basis of whether the facility has "complied with the construction, operational, maintenance, monitoring, and adaptive management requirements of a Technology Installation and Operation Plan." *Id.* § 125.94(d)(1). The petitioners contend that this provision impermissibly allows a facility's compliance to be determined not by reference to the performance standards themselves, but by evaluating whether a facility has complied with a plan to achieve the performance standards. In other words, they argue that the TIOP provision essentially allows for an unauthorized margin of error. The petitioners also argue that the EPA denied the public an opportunity to comment on the provision. Like the cost-cost compliance alternative, remand is appropriate here on two grounds: (1) the EPA did not give adequate notice regarding the provisions in section 125.94(d)(2); and (2) the record justification for the TIOP provision depends on the EPA's selection of a suite of technologies as BTA, a selection which has been remanded for further explanation. Given this, we remand the TIOP provision without reaching the merits here.

The Rule provides that during the first permit term, a facility may request that its compliance be determined based on whether it has complied with its TIOP, which must be designed to meet the performance standards, 40 C.F.R. § 125.94(d)(1), and submitted with a permit application, *id.* § 125.95(b)(4)(ii). During subsequent permit terms, if a facility has complied with its TIOP but is not meeting

the performance standards, the facility may request that its compliance with the standards during the following term be based on whether it remains in compliance with its TIOP, revised in accordance with the facility's adaptive management plan. 40 C.F.R. § 125.94(d)(2). The EPA explained in the Rule's preamble that it is difficult to determine reductions in impingement mortality and entrainment relative to what would have occurred in the absence of control technologies given natural variability and the vagaries of sampling methods. 69 Fed. Reg. at 41,613. The EPA explained further that it established the TIOP compliance options to account for these variabilities on the ability of a technology to meet the performance standards consistently over time. *Id.* at 41,613-14.

As previously noted, a "final rule must be a 'logical outgrowth' of the rule proposed." *Nat'l Black Media Coalition*, 791 F.2d at 1022. The final rule must have roots in the proposal, *Envtl. Integrity Project*, 425 F.3d at 996, which must "fairly apprise interested persons of the subjects and issues" involved in the rulemaking, *Nat'l Black Media Coalition*, 791 F.2d at 1022. An agency cannot "pull a surprise switcheroo" on interested parties between a proposal and the issuance of a final rule. *See Envtl. Integrity Project*, 425 F.3d at 996.

Although the Rule's proposal notified interested parties that the Agency was considering a provision that would give facilities time to achieve the performance standards after implementing new technologies, the EPA gave inadequate notice of the potentially indefinite scope of this provision. Specifically, the EPA failed to provide notice of the Rule codified at 40 C.F.R. § 125.94(d)(2), which permits a facility to be deemed in compliance with the Phase II

Rule in subsequent permit terms if it continues to adhere to its TIOP.

In the Rule's proposal, the EPA stated only that it was considering "the need for regulatory language that would allow facilities time to come into compliance [with the performance standards] if they choose to install technologies to meet the performance standards." 68 Fed. Reg. at 13,586. The proposal indicated further that the EPA was "evaluating and considering allowing six months, one year, two years, or five years (one permit term) for a facility to come into compliance after issuance of its permit." *Id.* The TIOP provision in the final Rule, by contrast, does not simply allow facilities additional time, up to one permit term, to come into compliance with the performance standards. Instead, it appears to permit a facility to satisfy the Rule's requirements in subsequent permit terms, for an indefinite period, without ever demonstrating compliance with the performance standards, so long as the facility has adhered to its TIOP. 40 C.F.R. § 125.94(d)(2) (stating that "[d]uring subsequent permit terms" a facility "may request that compliance ... be determined based on whether [it] remain[s] in compliance with" its TIOP). This aspect of the TIOP provision appears then not to be a "logical outgrowth" of the proposal, *see Nat'l Black Media Coalition*, 791 F.2d at 1022, because interested parties would not have divined from the proposal that facilities could be given an indefinite period to come into compliance with the national performance standards.

We thus remand the rule for failure to provide notice and comment and because the record justification for the TIOP provision depends on the EPA's selection of BTA, which has been remanded.

E. *Definitions of "New Facility" and "Existing Facility"*

The environmental petitioners challenge the reclassification in the Phase II Rule preamble of certain new constructions as "existing facilities," thereby rendering them subject to the Phase II Rule rather than the more stringent Phase I requirements that apply to new facilities. We agree with the petitioners that the Agency interpretively modified a definition appearing in the Phase I Rule via statements in the preamble to the Phase II Rule without providing interested parties notice and an opportunity for comment.

"An agency's interpretation of its own ... regulation must be given controlling weight unless it is plainly erroneous or inconsistent with the regulation." *Fowlkes v. Adamec*, 432 F.3d 90, 97 (2d Cir. 2005) (citations and internal quotation marks omitted). Although we typically owe considerable deference to an agency's construction of its own regulation, *Udall v. Tallman*, 380 U.S. 1, 16, 85 S. Ct. 792, 13 L.Ed.2d 616 (1965), "[u]nder settled principles of statutory and rule construction, a court may defer to administrative interpretations of a statute or regulation only when the plain meaning of the rule itself is doubtful or ambiguous," *Pfizer, Inc. v. Heckler*, 735 F.2d 1502, 1509 (D.C. Cir. 1984) (emphasis in original). "Deference to agency interpretations is not in order if the rule's meaning is clear on its face." *Id.* Implicit in the rule that an agency cannot interpret a regulation contrary to its unambiguous meaning is the requirement that "an agency must adhere to its own rules and regulations." *Reuters Ltd. v. FCC*, 781 F.2d 946, 950 (D.C. Cir. 1986). An agency may modify a regulation that has already been promulgated, therefore, only through the process of notice and comment rulemaking.

See Alaska Prof'l Hunters Ass'n, Inc. v. FAA, 177 F.3d 1030, 1034 (D.C. Cir. 1999); *see also* 5 U.S.C. § 551(5) (defining "rule making," which is governed by the notice and comment requirements of 5 U.S.C. § 553, as the "agency process for formulating, amending, or repealing a rule"); *Shalala v. Guernsey Memorial Hosp.*, 514 U.S. 87, 100, 115 S. Ct. 1232, 131 L.Ed.2d 106 (1995) (noting in dicta that APA rulemaking is required where an agency interpretation "adopt[s] a new position inconsistent with ... existing regulations").

The Phase I Rule defined "new facility" as any structure whose construction commenced after January 17, 2002 that meets both the definition of "new source" in 40 C.F.R. § 122.29 (discussed below) *and* one of two other requirements: the structure must use either (1) "a newly constructed cooling water intake structure" or (2) "an existing cooling water intake structure whose design capacity is increased to accommodate the intake of additional cooling water." *See* 40 C.F.R. § 125.83. A "new source" under section 122.29 is a facility that (1) "is constructed at a site at which no other source is located," (2) "totally replaces the process or production equipment that causes the discharge of pollutants at an existing source," or (3) undertakes "processes ... *substantially independent* of an existing source at the same site."[28] 40 C.F.R. § 122.29(b) (emphasis added). Section 122.29(b)

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[28] The Phase I Rule defined facilities meeting either of the first two tests of section 122.29(b) as "greenfield" facilities and facilities meeting the third test as "stand-alone" facilities. 40 C.F.R. § 125.83 ("A greenfield facility is a facility that is constructed at a site at which no other source is located, or that totally replaces the process or production equipment at an existing facility. A stand-alone facility ... is constructed on property where an existing facility is located and whose processes are substantially independent of the existing facility at the same site.").

provides further that, in determining whether a facility is "substantially independent" of an existing source, the director should consider "the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source." 40 C.F.R. § 122.29(b)(iii).

In determining whether a new construction qualifies as a "new facility" for purposes of the Phase I Rule, therefore, the permitting authority must perform a two-part, but not necessarily sequential, analysis. It must determine whether the construction uses a new cooling water intake structure or an existing structure whose capacity has been increased. The permitting authority must also determine whether the new construction qualifies as a "new source." Failure to meet either part of this analysis precludes the new construction from qualifying as a "new facility," and thus from falling under the Phase I Rule's purview.

The Phase I Rule stated that "new facilities" meeting the foregoing requirements include a "stand-alone" facility, which the Phase I Rule defined as "a new, separate facility that is constructed on property where an existing facility is located and whose processes are substantially independent of the existing facility at the same site." *Id.* § 125.83. This is because such a facility, by definition, essentially qualifies as a "new source." *Compare id. with* § 122.29 (defining "new source" as including a facility that undertakes "processes ... substantially independent of an existing source at the same site"). The Phase I Rule clarified, however, that "new facility" does not include "new units that are added to a facility for purposes of the same general industrial operation (for example, a new peaking unit at an electrical generating station)." *Id.* § 125.83. This is presumably because such units do not

qualify as "new sources" in that they are not substantially independent of existing sources. *See id.* § 122.29(b)(1)(iii) (setting forth the factors to be considered in determining substantial independence, including "the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source"). The Phase I Rule thus appears to have left regulation over the following to a subsequent rulemaking phase: (1) new stand-alone facilities that use existing intake structures whose design capacity is not increased and (2) new units that are added to a facility for purposes of the same general industrial operation even if they require either an increase in the intake structure design capacity or the construction of a new cooling water intake structure altogether. *Id.*[29]

The Phase II Rule defines "existing facility" as any facility whose construction commenced on or before January 17, 2002, "and any modification of, or any addition of a unit at such a facility that does not meet the definition of a new facility at § 125.83." *Id.* § 125.93. Thus, from this definition, it appears that new stand-alone facilities that use existing, unmodified intake structures and new units added to a facility for purposes of the same industrial operation, regardless of their impact on the facility's cooling water intake structure, (i.e., the two kinds of new constructions left

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[29] A facility would clearly find it advantageous to classify a new construction on its grounds as one added for purposes of the same general industrial operation rather than as a stand-alone facility. A stand-alone facility is treated as an existing facility only if it uses an existing intake structure whose capacity is not increased; a "new unit," by contrast, is treated as part of an existing facility even if it requires the construction of a new intake structure or an increase in an existing intake structure's capacity.

unregulated by the Phase I Rule) are considered "existing facilities" and governed by the Phase II Rule.

The parties' dispute concerns statements in the preamble to the Phase II Rule that purportedly narrow, by way of interpretation, the Phase I Rule's definition of "new facility"[30] without the required procedures of notice and comment. In the preamble to the Phase II Rule, the EPA states that "the Phase I[R]ule treated almost all changes to existing facilities for purposes of the same industrial operation as existing facilities." 69 Fed. Reg. at 41,579. The preamble then appears to distinguish stand-alone facilities from new units that are part of the same industrial operation, thereby defining the latter as existing facilities without reference to the definition of "new source" or the "substantial independence" test of 40 C.F.R. § 122.29. *Id.* at 41,579 n. 2a. The preamble states that the "substantial independence" test does not apply where there is an addition to an existing facility for purposes of the same industrial operation, such as the "addition of new generating units at the same site" as an existing facility, *id.* at 41,579, because such additions "are categorically treated as 'existing facilities' regardless of any other considerations unless they completely replace an existing facility and its cooling water design intake capacity is increased," *id.*

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[30] We find no merit to the EPA's argument that the state and environmental petitioners here are ostensibly challenging the Phase II Rule's definition of "existing facility" but are actually seeking review of the meaning of "new facility" under the Phase I Rule—for which their claim would be time-barred. Though the EPA claims that "[n]othing in the Phase II Rule altered or amended the definition of 'new facility,' " it is clear from the discussion above that the preamble to the Phase II Rule eliminates without notice or comment the analysis the Phase I Rule had required.

at 41,579 n. 2a. These comments are contrary to the plain meaning of the relevant portion of the Phase I Rule.

The Phase I Rule unambiguously stated that "new facility" means any structure that is a "new source," as defined by 40 C.F.R. § 122.29, subject to certain other requirements. Under this provision, a source is considered "new" if, *inter alia*, "[i]ts processes are substantially independent of an existing source at the same site." 40 C.F.R. § 122.29(b)(1)(iii). A permitting authority could not classify a source constructed at the site of an existing source as new or existing for purposes of the Phase I Rule, therefore, without reference to the "substantial independence" test. It is plain, then, that the Phase I Rule distinguished between "stand-alone" facilities and "new units," where the new construction is not built at an empty site and does not totally replace an existing source, by reference to the definition of a "new source." A stand-alone facility is "substantially independent" of an existing facility, and therefore a new source; a new unit that is part of the same industrial operation as an existing facility is not substantially independent of an existing facility, and therefore not a new source. It is impossible to determine which classification applies to a particular construction under the Phase I Rule without referring to the definition of "new source," i.e., whether it satisfies the "substantial independence" test. Put differently, the touchstone of the definition of "new facility" in the Phase I Rule is whether a source is a "new source." The Phase I Rule's plain terms thus indicate that a unit that is "substantially independent" of an existing facility is not "part of the same general industrial operation" as the existing facility. Any elimination of the "substantial independence" inquiry, therefore, strikes at the heart of the Phase I Rule and

its classification of what facilities are subject to its requirements.

The EPA claims that the Phase II Rule has in no way eliminated the "substantial independence" test and that the Rule's preamble merely makes clear that the fifth sentence in section 125.83 exempts "new units" from regulation under the Phase I Rule. This argument fails because the Phase I Rule provides no way to distinguish between stand-alone facilities and new units where the construction is built on a site where a source is already located and does not totally replace the existing source except by reference to the "substantial independence" test, i.e., without assessing the factors set forth at 40 C.F.R. § 122.29(b)(1)(iii) in order to determine whether the source is new or existing. Just as "stand-alone facility" has no intrinsic meaning, neither does "new unit." The Phase I Rule defines each by reference to the "substantial independence" test of section 122.29(b). Thus, while an existing facility can be repowered with new generating units and remain an "existing facility" for regulatory purposes under section 316(b), the determination can only be made by reference to whether a particular new generating unit is a stand-alone facility or a new unit that is part of the same general industrial operation as an existing facility. In fact, a permitting authority must first determine whether a source is "new" within the meaning of 40 C.F.R. § 122.29(b) before it can conclude that the source is a stand-alone facility or a new unit added to an existing facility for purposes of the same general industrial operation.

Because the Phase I Rule was not ambiguous, we do not owe deference to the Agency's interpretation of the Phase I Rule in the preamble to the Phase II Rule. *See Fowlkes*, 432 F.3d at 97; *Pfizer*, 735 F.2d at 1509. By permitting the Agency to determine that a new

construction is not subject to the Phase II Rule without any definitional guidance and in contravention of the Phase I Rule, the EPA has expanded the scope of what may be classified as a "new unit" while narrowing the Phase I definition of "stand-alone" facility. Moreover, by including a potentially expansive definition of "new unit" in the preamble to the Phase II Rule, the EPA has interpretively modified the definitions that appeared in the Phase I Rule without providing interested parties an opportunity for notice and comment.

Accordingly, we direct the EPA on remand to adhere to the definitions set forth in the Phase I Rule, *see Reuters*, 781 F.2d at 950-52, or to amend those definitions following notice and comment, *see Alaska Prof'l Hunters*, 177 F.3d at 1034.

IV. *The Industry Petitioners*

A. *Applicability of Section 316(b) to Existing Facilities*

Entergy argues that the EPA lacks authority to apply CWA section 316(b) to existing, as opposed to new, facilities. We disagree and conclude that, at the very least, the EPA permissibly interpreted the statute to cover existing facilities and that its interpretation is therefore entitled to deference under *Chevron*.

Entergy's argument turns primarily on the statutory language that the best technology available be reflected in the "location, design, construction, and capacity of cooling water intake structures"—a collection of words Entergy contends indicates Congress's intent to regulate only new facilities.[31]

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[31] Entergy cites a number of federal statutory and regulatory provisions using similar words and argues that each provision applies only in the pre-construction context. The environmental

Entergy argues further that the EPA has authority to approve cooling water intake structures only before construction and cannot regulate these structures through the NPDES permits issued pursuant to CWA section 402(a)(1), 33 U.S.C. § 1342(a)(1), which allows the Administrator to "issue a permit for the discharge of any pollutant," but not, in Entergy's view, to cover existing intake structures.

The EPA emphasizes that section 316(b) cross-references section 301, which applies to existing facilities, and that the Agency's historical practice of applying section 316(b) to existing facilities effectuates Congress's objectives in enacting the CWA. The EPA contends that Congress's link between effluent limitations established pursuant to section 301 and BTA under section 316(b) indicates an intent to regulate cooling water intake structures at existing facilities. The EPA thus argues that the intake-structure standard is to be applied whenever an intake structure is present at a point source of pollutant discharge, whether that point source is new or existing. As to Entergy's argument concerning the ability to

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petitioners contend that the provisions upon which Entergy relies explicitly limit their application to new facilities and that, as a result, the words "location, design, construction and capacity," standing alone, do not apply solely to new facilities; otherwise, the environmental petitioners' argument goes, there would be no need to limit expressly the provisions' applicability to new facilities. For example, 49 U.S.C. § 60103, which governs safety standards for liquefied natural gas pipelines, by its express terms does not apply to certain existing facilities. 49 U.S.C. § 60103(c) ("Except as provided in paragraph (2) of this subsection, a design, location, installation, construction, initial inspection, or initial testing standard prescribed under this chapter after March 1, 1978, does not apply to an existing liquefied natural gas pipeline facility ...."). These are additional reasons for the holding discussed in this opinion.

assess intake structures during NPDES permitting proceedings, the EPA argues that its decision to implement the Phase II requirements through NPDES permits has a strong textual basis. It notes that section 402 provides for the issuance of "a permit for the discharge of any pollutant" so long as the discharge meets "all applicable requirements under sections 1311 ... [and] 1316," sections 301 and 306 of the CWA respectively. CWA § 402(a)(1), 33 U.S.C. § 1342(a)(1). EPA contends that the Phase II requirements are "requirements under sections 1311 ... [and] 1316" and therefore that cooling water intake structures may be regulated via permits issued pursuant to section 402.

The EPA has the better of both arguments. As to whether section 316(b) applies to existing facilities, we find Entergy's textual argument, while superficially appealing, ultimately to be unavailing. Nothing in section 316(b) indicates that because it applies to the "location, design, construction, and capacity" of a facility's cooling water intake structure, the section is therefore limited to new facilities and does not require existing facilities either to modify existing intake structures or to construct new intake structures in order to come into compliance with the EPA's Rule.[32]

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[32] We are not persuaded by Entergy's selective definitions of the terms "location, design, construction, and capacity." While we agree that words in a statute are to be accorded "their ordinary, contemporary, common meaning," *Harris v. Sullivan*, 968 F.2d 263, 265 (2d Cir. 1992), it is clear that the EPA's interpretation of the statute does not deviate from this requirement. *See, e.g.*, Black's Law Dictionary 958 (8th ed. 1999) ("[L]ocation" is "[t]he specific place or position of a person or thing."); *id.* at 478 ("[D]esign" means "a plan or scheme" or "[t]he pattern or configuration of elements in something."); *id.* at 332 ("[C]onstruction" is "[t]he act of building," but also "the thing so built."); Webster's Third New Int'l Dictionary 330 (1986) ("[C]apacity" means "the power or ability to hold, receive or

In fact, given the cross-references in section 316(b) to provisions governing both new and existing facilities, the EPA's reading is far more reasonable than Entergy's. *See E.I. du Pont de Nemours & Co. v. Train*, 430 U.S. 112, 121, 97 S. Ct. 965, 51 L.Ed.2d 204 (1977) ("Section 301(b) [to which section 316(b) expressly refers] defines the effluent limitations that shall be achieved by existing point sources ...."); *id.* at 136, 97 S. Ct. 965 (holding that "301 does authorize the [Agency] to promulgate effluent limitations for classes and categories of existing point sources"). The cross-reference to section 301 is particularly significant given that Congress, having made this explicit cross-reference, did not then limit section 316(b)'s application to new facilities—which would have been a simple task to do. At the very least, the EPA's view that section 316(b) applies to existing facilities is a reasonable interpretation of the statute, and we therefore accord it deference. *See Chevron*, 467 U.S. at 842-43, 104 S. Ct. 2778.

Entergy's argument concerning the permitting process presents a closer question, but it is ultimately not persuasive and does not undermine our conclusion that section 316(b), on its face, applies to existing facilities. The textual basis for the EPA to regulate cooling water intake structures during the periodic permitting process applicable to the discharge of pollutants is not immediately apparent. Section 402 conditions the issuance of a permit on the circumstance that a "*discharge* will meet ... all applicable requirements under sections 1311..[and] 1316." CWA

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accommodate" and "a containing space: a measure of content for gas, liquid, or solid."). Nothing in the above definitions suggests the EPA could not have reasonably interpreted such words to include existing facilities.

§ 402(a)(1), 33 U.S.C. § 1342(a)(1) (emphasis added). While the Phase II requirements are "requirements" under sections 301 and 306, they do not apply to the discharge of pollutants, and section 402 says nothing about conditioning a permit on compliance with *other* requirements of sections 301 and 306, i.e., requirements not relating to the discharge of pollutants. Despite this textual hiccup, the EPA's decision to use the NPDES process to enforce section 316(b) is not unreasonable. Insofar as the provision applies to existing facilities—and the cross-reference in section 316(b) to section 301 provides a clear textual basis for that conclusion—the EPA could enforce it only through some permit process following the issuance of an initial construction permit. Moreover, the structure of section 316(b) supports the view that its requirements are to be enforced through the same process used to enforce the effluent limitations of sections 301 and 306. As noted, the statute requires that any standard established by the EPA to govern the discharge of pollutants from existing facilities must also regulate cooling water intake structures. CWA § 316(b), 33 U.S.C. § 1326(b) (providing that "[a]ny standard established pursuant to section 1311 ... or section 1316" shall also regulate the cooling water intake structures of point sources). In light of this language, it is at least reasonable to conclude that Congress intended the requirements of section 316(b) to be part and parcel of any regulation of, and therefore any permit issuance relating to, the discharge of pollutants. *See Riverkeeper I*, 358 F.3d at 185-86. It is a fair conclusion that section 402 implicitly requires permitting authorities to ensure compliance with section 316(b) as a permit condition. *See U.S. Steel Corp. v. Train*, 556 F.2d 822, 850 (7th Cir. 1977) ("[Section] 402(a)(1) implicitly requires the Administrator to insure compliance with § 316(b) as

one of the permit conditions."), *overruled on other grounds by City of West Chicago, Ill. v. U.S. Nuclear Regulatory Comm'n*, 701 F.2d 632, 644 (7th Cir. 1983) (abandoning the view that 5 U.S.C. § 558(c) independently provides that formal adjudicatory hearings must be held when requested by a license applicant under CWA § 402). Section 402 thus does not undermine the deference to which the Agency's interpretation of section 316(b) is entitled under *Chevron*.

Because section 316(b) plainly applies to existing facilities and Congress intended the requirements of section 316(b) to apply in tandem with the effluent limitations established pursuant to sections 301 and 306, we conclude that the EPA may regulate cooling water intake structures via the NPDES permit process. Otherwise, Congress's intent to regulate the intake structures of existing facilities could not be effectuated.[33] Accordingly, we reject this aspect of Entergy's challenge.

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[33] Entergy also contends that section 316(b) cannot be enforced via a citizen suit pursuant to section 505(a)(1), 33 U.S.C. § 1365(a)(1), because that provision covers only violations of "an effluent standard or limitation" or "an order issued by the Administrator or a State with respect to such a standard or limitation," and that the statute therefore applies only in the pre-construction context. Because the case before us is not a citizen suit, we are not directly presented with the question of whether a citizen can sue to enforce section 316(b) and do not decide the question. We are not, however, persuaded by Entergy's argument. The citizen suit provision states that a citizen may commence a suit against any person who is alleged to be in violation of "an effluent standard or limitation under this chapter." CWA § 505(a)(1), 33 U.S.C. § 1365(a)(1). Viewed in light of this language alone, it is difficult to characterize a violation of regulations promulgated pursuant to section 316(b) as a violation of an "effluent standard or limitation." The statute, however,

B. *Definition of "Adverse Environmental Impact"*

In the Phase II Rule, as in the Phase I Rule, the EPA has interpreted the statutory directive of section 316(b) to minimize "adverse environmental impact" ("AEI") to require the reduction of "the number of aquatic organisms lost as a result of water withdrawals associated" with cooling water intake structures. 69 Fed. Reg. at 41,586. This interpretation reflects the fact that section 316(b) is a somewhat unusual provision of the CWA in that it governs the environmental effects of large scale withdrawals from waters of the United States rather than the release of pollutants into receiving water. As did the industry petitioners in *Riverkeeper I*, PSEG argues that the EPA arbitrarily defined AEI to include any loss of or harm to aquatic organisms due to impingement mortality and entrainment rather than only more severe "population-level effects." It contends that the EPA has historically focused on the "population dynamics" of aquatic organisms and the fact that many of these organisms are "density dependent," i.e., they produce large numbers of offspring, only a few of which

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defines "effluent standard or limitation" to include "an effluent limitation or other limitation under section 1311" and a "standard of performance under section 1316." CWA § 505(f), 33 U.S.C. § 1365(f). Arguably, therefore, a limitation established pursuant to section 316(b) is an "other limitation under section 1311" and a "standard of performance under section 1316," given the cross-reference to sections 301 and 306 in section 316(b), and thus falls within the scope of the citizen-suit provision. While we do not decide the question here, we do not read the citizen suit provision to undermine the deference we accord the EPA's reasonable interpretation pursuant to *Chevron* that section 316(b) applies to existing facilities.

survive to adulthood.[34] On the theory that the "vast majority" of entrained organisms would have died of natural causes in any event, PSEG argues that reduction of impingement mortality and entrainment will have only a marginal positive environmental impact.[35] PSEG contends that because the Agency has changed course from its longstanding interpretation of AEI without giving a clear and reasoned justification for its decision, the EPA's Rule is entitled to less deference than it otherwise would receive. PSEG also argues that the Phase II Rule's exclusion from the entrainment-reduction requirement of facilities withdrawing small amounts of water, facilities withdrawing water from lakes other than the Great

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[34] PSEG relies on the Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment, prepared by the EPA in 1977. While the EPA indicated in this document that "[a]dverse environmental impacts occur whenever there will be entrainment or impingement damage as a result of the operation of a specific cooling water intake structure," PSEG focuses on the Agency's statement that the "critical question" is "the magnitude of any adverse impact."

[35] The environmental petitioners contend that PSEG has missed the mark here entirely. They argue that when organisms die of natural causes they remain available as food for top predators, but that when organisms are entrained, and potentially disintegrated, they are consumed by lower organisms. They argue also that entrained organisms are not available to consume organisms lower on the food chain. The environmental petitioners thus contend that one of the primary adverse environmental impacts of impingement mortality and entrainment is their effect on the ecosystem as a whole by disrupting the food chain. The EPA discussed these and other environmental impacts attributable to impingement mortality and entrainment in the preamble to the Phase II Rule, concluding that "[d]ecreased numbers of aquatic organisms can disrupt aquatic food webs and alter species composition and overall levels of biodiversity." 69 Fed. Reg. at 41,586.

Lakes, and facilities that have a small capacity utilization rate undercuts the EPA's determination that impingement mortality and entrainment are *per se* adverse environmental impacts. We are not persuaded by PSEG's arguments.

We agree with the EPA that the Phase II Rule is based on substantially the same record evidence of impingement mortality and entrainment relied upon in promulgating the Phase I Rule and that we rejected substantially the same arguments advanced here by the industry petitioners in *Riverkeeper I*, 358 F.3d at 197 ("The EPA considered all of the factors that UWAG now raises, and we are inclined to defer to the EPA's judgment of how best to define and minimize 'adverse environmental impact.'" (internal footnote omitted)). *Riverkeeper I* thus controls this issue.

In *Riverkeeper I*, we rejected the arguments that some species are nuisances and require eradication, that other species respond to population losses by increasing their reproduction, and that removing large numbers of aquatic organisms from waterbodies is not in and of itself an adverse impact. 358 F.3d at 196. We specifically rejected the view that "the EPA should only have sought to regulate impingement and entrainment where they have deleterious effects on the overall fish and shellfish populations in the ecosystem, which can only be determined through a case-by-case, site-specific regulatory regime." *Id.* We emphasized that "the EPA's focus on the number of organisms killed or injured by cooling water intake structures is eminently reasonable." *Id.* We reiterated that Congress had "rejected a regulatory approach that relies on water quality standards," analogizing the argument pressed there as urging what is essentially a water quality standard that focuses on fish populations

and consequential environmental harm.[36] *Id.* at 196-97. Given that the record evidence on this issue has not changed in any meaningful way since the Phase I rulemaking, we are both persuaded and bound by our statements on this issue in *Riverkeeper I*.

Were we considering the issue in the first instance, however, we would be inclined to defer to the EPA's judgment in any event. The EPA explained that it has set "performance standards for minimizing adverse environmental impact based on a relatively easy to measure and certain metric—reduction of impingement mortality and entrainment." 69 Fed. Reg. at 41,600. It explained further that it chose this approach "because impingement and entrainment are primary, harmful environmental effects that can be reduced through the use of specific technologies" and stated that "where other impacts at the population, community, and ecosystem levels exist, these will also be reduced by reducing impingement and mortality." *Id.* We see no

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[36] We make an additional observation here, which we cited in *Riverkeeper I* as a reason for rejecting restoration measures as impermissible under the statute. It is significant that in section 316(a), which governs thermal discharges, Congress permits the EPA to vary the standard applicable to a point source "by considering the particular receiving waterbody's capacity to dissipate the heat and preserve a 'balanced, indigenous' wildlife population." 358 F.3d at 190. It is also significant that Congress "did not include that [water quality or population level] approach (or make any reference to it) in the very next subsection," *id.*, since "where Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion." *Id.* (quoting *Bates v. United States*, 522 U.S. 23, 29-30, 118 S. Ct. 285, 139 L.Ed.2d 215 (1997) (internal quotation marks omitted)). The statutory structure thus indicates that Congress did not intend to limit "adverse environmental impact" in section 316(b) to population-level effects.

reason to second-guess this judgment, given the Agency's consideration of the various environmental consequences of cooling water intake structures. *See Nat'l Wildlife Fed'n*, 286 F.3d at 570 (noting that courts afford the EPA considerable discretion to weigh and balance various factors in determining how to establish performance standards).[37]

C. *Zero Entrainment Survival Assumption*

The Phase II Rule requires a reduction of impingement *mortality*, but a reduction of entrainment *generally*. *See* 40 C.F.R. § 125.94(b). The industry petitioners contend that the EPA improperly presumed that all entrained organisms are killed. They argue that the Rule's assumption that no organisms survive entrainment is contrary to the evidence which, in their view, indicates a survival rate of significantly more than zero. We conclude that in light of uncertain record evidence, the EPA acted within its discretion in assuming zero entrainment survival.

The EPA explained in the preamble to the Phase II Rule that it assumed zero percent entrainment survival because it "does not have sufficient data to establish performance standards based on entrainment survival

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[37] We also find no merit in PSEG's claim that the final Rule gave no notice of the supposed change in the EPA's view of "adverse environmental impact." Not only did the proposed Rule seek comment on several competing definitions, one of which referred to gauging such impact in part by examination of the "absolute damage" wrought by impingement and entrainment, but in which the EPA noted that "there will be adverse environmental impact whenever there is entrainment or impingement 'damage' as a result of a cooling water intake structure." 67 Fed. Reg. at 17,162. While the EPA did not ultimately adopt any of the definitions it noticed, it is clear that PSEG was "fairly apprise[d]" that the EPA was considering an approach to AEI that looked to entrainment and impingement at the individual level. *Nat'l Black Media Coalition*, 791 F.2d at 1022.

for the technologies used as the basis for today's rule." 69 Fed. Reg. at 41,620. It explained further that it "believes the current state of knowledge does not support reliable predictions of entrainment survival that would provide a defensible estimate for entrainment survival above zero at a national level." *Id.* It also stated that the performance standard would likely have been higher had it incorporated entrainment survival into its conclusions. *Id.* While impingement mortality can be readily quantified, the EPA contends, entrainment mortality cannot because many entrained organisms are small, fragile, and prone to disintegrate during entrainment. The EPA also contends that death from entrainment sometimes occurs immediately but other times only after an organism is discharged back into the waterbody. In view of these factors, the EPA claims that it reasonably concluded that the available data did not support an estimate of entrainment survival at the national level.

None of the peer reviewers accepted the EPA's assumption of zero percent survival. For instance, peer reviewer Dr. Mark Bain was "not convinced by the arguments presented that fish do not survive entrainment in significant numbers" and concluded that there is "very strong evidence that entrainment survival is not zero." Another peer reviewer, Dr. Charles Hocutt, concluded that the EPA's assumption is based on inference and innuendo and does not statistically refute opposing views. Although peer reviewer Dr. Greg Garman stated that the study submitted by the power industry was "very clearly biased" and "too seriously flawed to provide a serious challenge to the EPA position," he also noted that "EPA's position is only slightly more defensible" given the lack of rigorous statistical analyses.

No peer reviewer, however, expressed the belief that reliable national statistics on entrainment survival exist. Hocutt found "it difficult for the layman and professional alike to draw confident conclusions without a detailed analysis" of the evidence, and Garman suspected a lack of sufficient data "to conduct a definitive and statistically valid test of the EPA zero survival assumption." While these comments do not, on balance, support the EPA's assumption, neither do they reflect any meaningful agreement on the incidence of entrainment survival.

Given the statutory directive to set national standards and the well-documented uncertainty in the entrainment data, the EPA was well within its authority to determine that it could not provide a reasonable estimate of entrainment survival on a national basis. Judicial review is considerably deferential when "the agency's decision rests on an evaluation of complex scientific data within the agency's technical expertise." *Texas Oil & Gas Ass'n*, 161 F.3d at 934; *City of Waukesha v. EPA*, 320 F.3d 228, 247 (D.C. Cir. 2003) (stating that an agency is entitled to "an extreme degree of deference ... when it is evaluating scientific data within its technical expertise" (citation and internal quotation marks omitted)). Moreover, "it is within EPA's discretion to decide that in the wake of uncertainty, it would be better to give the values a conservative bent rather than err on the other side." *Am. Iron & Steel Inst. v. EPA*, 115 F.3d 979, 993 (D.C. Cir. 1997). Indeed, one peer reviewer expressly noted that the EPA had adopted a "conservative approach" by its assumption of zero entrainment survival in the Rule. It is thus clear that the EPA acted well within its discretion in presuming zero entrainment survival after the Agency had reviewed a substantial body of complex scientific

data, and acknowledging that the evidence is inconclusive, it adopted a conservative approach.

For these reasons and those stated in *Riverkeeper I*, we therefore "defer to the EPA's judgment of how best to define and minimize 'adverse environmental impact.'" 358 F.3d at 197.

D. *Nuclear Plants*

Entergy contends that the Phase II Rule fails to account for its purportedly disproportionate impacts on nuclear power plants and is therefore arbitrary and capricious. Entergy argues that nuclear facilities face unique safety concerns associated with the stable flow of cooling water to ensure safe reactor operation and shutdown. Any change in water intake or obstruction of water intake systems due to, for example, the clogging of screens, it argues further, affects nuclear power facilities in specific and serious ways. Entergy takes the position that the EPA failed to account for these issues in the Phase II Rule. We disagree because the record demonstrates adequate consideration by the EPA of nuclear plants' particular concerns.

The EPA considered and responded to comments from nuclear facilities during the rulemaking process. Most importantly, the Agency considered whether the Rule's requirements presented any concerns relating to the safety of nuclear facilities. 69 Fed. Reg. at 41,585 (noting that the EPA had coordinated with the Nuclear Regulatory Commission to ensure that there would not be a conflict between the EPA Rule and safety requirements applicable to nuclear facilities). The EPA ultimately included in the Phase II Rule a provision that accounts for this concern by providing for a site-specific compliance alternative for nuclear facilities. This provision states that if a nuclear facility "demonstrate[s] to the [EPA] based on consultation with the Nuclear Regulatory Commission that

compliance with this subpart would result in a conflict with a safety requirement established by the Commission, the [EPA] must make a site-specific determination of best technology available for minimizing adverse environmental impact that would not result in a conflict." 40 C.F.R. § 125.94(f).

We defer to the EPA's determination that this compliance alternative ensures that any safety concerns unique to nuclear facilities will prevail over application of the general Phase II requirements. *See Nat'l Wildlife Fed'n*, 286 F.3d at 570 (noting that appellate courts give an agency considerable discretion when it has weighed and balanced the appropriate factors); *BP Exploration & Oil, Inc. v. EPA*, 66 F.3d 784, 802 (6th Cir. 1995) ("The overriding principle in our review of the Final Rule is that the agency has broad discretion to weigh all relevant factors during rulemaking. The CWA does not state what weight should be accorded to the relevant factors; rather, the Act gives EPA the discretion to make those determinations."). Moreover, we are persuaded that the generous cost-cost compliance alternative, which we remand for lack of notice but do not address on the merits, may further account for Entergy's concerns.

Accordingly, we deny the petition for review insofar as it challenges the Rule's application to nuclear facilities.

E. *Independent Suppliers*

The Phase II Rule provides that a large, existing facility is subject to the Rule's requirements even when it obtains cooling water from an independent supplier that is not itself a Phase II existing facility. 40 C.F.R. § 125.91(c). Put differently, a Phase II facility can purchase cooling water only from suppliers whose intake structures are in compliance with the Phase II Rule. The provision is intended to prevent

circumvention of the Rule by purchasing cooling water from non-Phase II entities. UWAG argues that the EPA gave inadequate notice of the scope of this so-called third-party or independent-supplier Rule. We agree.

UWAG contends that while the Phase I Rule included an independent-supplier provision similar to the one at issue here, the parallel provision of the Phase I Rule applies only to third-party suppliers that are not point sources, and thus do not need discharge permits and are not subject to any rule promulgated pursuant to section 316(b).[38] UWAG argues that the Rule's proposal indicated that the Phase II provision would track the language of the Phase I provision. UWAG contends, therefore, that the EPA gave inadequate notice of the more broadly phrased provision that was actually promulgated: a rule applying both to the intake structures of third-parties that are not point sources, and therefore not subject to direct regulation under section 316(b), as well as to facilities with intake structures that will be governed by the Phase III rule, which will encompass smaller power plants and other facilities. The issue is thus whether the EPA provided adequate notice that the Rule ultimately promulgated would impose Phase II

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[38] The Phase I Rule provided that

> [u]se of a cooling water intake structure includes obtaining cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) of cooling water if the supplier or suppliers withdraw(s) water from waters of the United States .... [t]his provision is intended to prevent circumvention of these requirements by creating arrangements to receive cooling water from an entity that is not itself a point source.

40 C.F.R. § 125.81(b).

requirements on Phase III facilities that supply cooling water to Phase II facilities.

As we have noted, our inquiry into whether an agency has provided adequate notice of its rulemaking as required by the APA is guided by the "logical outgrowth" test. *Nat'l Black Media Coalition*, 791 F.2d at 1022. That is, we must determine whether the Agency's notice fairly apprised interested parties of the rulemaking, *id.*, or whether the final Rule was sufficiently remote or distant from the Agency's proposal to constitute a "surprise switcheroo," *Envtl. Integrity Project*, 425 F.3d at 996.

The proposed Rule published in the Federal Register stated that "[u]se of a cooling water intake structure includes obtaining cooling water by any sort of contract or arrangement with an independent supplier (or multiple suppliers) of cooling water if the supplier or suppliers withdraw(s) water from waters of the United States." 67 Fed. Reg. at 17,220. The notice then stated that the provision was intended "to prevent circumvention of these requirements by creating arrangements to receive cooling water from *an entity that is not itself a point source*," *id.* (emphasis added), indicating that the provision would track the Phase I Rule's language. The initial language of the provision appearing in the proposal—defining "independent supplier" as any provider that withdraws water from waters of the United States—is virtually identical to the language in the final Rule.[39] The final

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[39] The final Rule provides that "[u]se of a cooling water intake structure includes obtaining cooling water by any sort of contract or arrangement with one or more independent suppliers of cooling water if the supplier withdraws water from waters of the United States but is not itself a Phase II existing facility.... This provision is intended to prevent circumvention of the requirements by

Rule, however, states that it "is intended to prevent circumvention of these requirements by creating arrangements to receive cooling water from *an entity that is not itself a Phase II existing facility*." 40 C.F.R. § 125.91(c) (emphasis added). This difference, while small, is not insignificant. As noted, under the proposed Rule, Phase II facilities could purchase cooling water from facilities complying with the Phase I, II, or III requirements. Under the final Rule, by contrast, Phase II facilities can purchase cooling water only from facilities complying with the Phase II Rule. The proposal therefore apprised affected parties of the general subject, but not the scope, of the Rule ultimately promulgated.

Interested parties were thus given notice that the EPA sought to prevent circumvention of its rules and an opportunity to comment on this general policy, but could not have anticipated the final Rule's scope. Indeed, while the final provision has roots in the proposal, it clearly reaches further than the proposed provision and even the more stringent Phase I Rule. Affected parties would therefore have had no reason to anticipate the Agency's final course in light of the initial notice. Because the EPA provided inadequate notice of the scope of the Phase II Rule's independent-supplier provision, we conclude that the Rule ultimately promulgated is not a "logical outgrowth" of the proposed Rule. *Nat'l Black Media Coalition*, 791 F.2d at 1022.

Our conclusion rests in large part on the similarity between the Phase I Rule's independent-supplier provision and the proposed Phase II Rule's parallel provision. Given that the requirements under the

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creating arrangements to receive cooling water from an entity that is not itself a Phase II existing facility." 40 C.F.R. § 125.91(c).

Phase I Rule are more stringent than those imposed under the Phase II Rule, the proposal provided no notice that the Phase II Rule's independent-supplier provision would be *more* stringent than the Phase I Rule's provision. We therefore remand this aspect of the Rule.

F. *Definition of "Great Lakes"*

The entrainment performance standard of 40 C.F.R. § 125.94(b)(2) applies to facilities that use cooling water "withdrawn from ... one of the Great Lakes." 40 C.F.R. § 125.49(b)(2)(ii)(A). "Great Lakes," however, is not defined in the Rule. An affidavit of UWAG's counsel states that UWAG members

> have been told by state regulators that they have been told by EPA Headquarters that EPA would apply the Great Lakes national performance standards regarding impingement and entrainment to the cooling water intake structures located in the Great Lakes connecting channels or in waterways with open fish passage to a Great Lake and within 30 miles from a Great Lake.

UWAG argues that interested parties were given no notice of this interpretation of the Phase II Rule or opportunity to comment on it and that the interpretation has no record support. UWAG also remarks that the EPA mentioned in the preamble to the Rule that in assessing the national environmental benefits of its final Phase II Rule, it had evaluated the benefits in seven study regions. The EPA defined the Great Lakes region for that purpose as follows:

> The Great Lakes region includes all facilities in scope of the Phase II rule that withdraw water from Lakes Ontario, Erie, Michigan, Huron, and Superior or are located on a waterway with open

> fish passage to a Great Lake and within 30 miles of the lake.

69 Fed. Reg. at 41,655. UWAG contends that the EPA never indicated that this definition would apply to § 125.94(b)(2) and seeks either a ruling that "Great Lakes" has its ordinary meaning or a remand for an express definition of what the term means.

Notwithstanding UWAG's proffer that the EPA has informally interpreted "Great Lakes," the Rule itself does not define what is encompassed by the term, and UWAG has provided no documentary evidence that the EPA has issued a formal and binding definition or even applied a particular definition in a permitting proceeding. There is, therefore, no final agency action for us to review. We agree with the holding of the Seventh Circuit in *American Paper Institute, Inc. v. Environmental Protection Agency*, that in the absence of a formal and binding rule or some other final agency action, judicial review is not available at this time. 882 F.2d 287, 289 (7th Cir. 1989). We therefore dismiss for lack of jurisdiction so much of the petition for review as challenges the purported definition of "Great Lakes."

G. *Preemptive Preservation of Issues*

UWAG has purported to "preserve" the right to raise new challenges to the Phase II Rule if we remand significant aspects of it to the EPA because UWAG views the Rule as an integrated whole. If certain aspects of the Rule are remanded, UWAG suggests, previously unobjectionable provisions may become, in its view, unacceptable. We are not sure what challenges UWAG seeks to preserve. Of course, UWAG will have the right to challenge any rule the EPA may promulgate on remand through a new petition for review. *See* 33 U.S.C. § 1369(b). Insofar as UWAG seeks to raise further challenges following the issuance of our ruling but before the EPA acts on

remand, however, it waived those challenges by failing to raise them in the briefs it has already submitted to this Court. *See Norton v. Sam's Club*, 145 F.3d 114, 117 (2d Cir. 1998) (noting that issues not argued in a party's briefs are considered waived). We thus reject UWAG's claim to have preserved the right to raise new challenges to the Rule currently before us on this petition for review.

CONCLUSION

For the foregoing reasons, the state and environmental petitioners' petitions are granted in part and denied in part, and the industry petitioners' petitions granted in part, denied in part, and dismissed in part for lack of jurisdiction. We remand to the EPA the provision establishing BTA so that it may provide either a reasoned explanation of its decision or a new determination of BTA based on permissible considerations. We further remand the site-specific cost-cost variance and the TIOP provision because the cost-cost variance and subpart (d)(2) of the TIOP provision provided inadequate notice and both depend on the BTA determination, which we remand today.

We remand as based on impermissible constructions of the statute those provisions that (1) set performance standards as ranges without requiring facilities to achieve the greatest reduction of adverse impacts they can; (2) allow compliance through restoration measures; and (3) authorize a site-specific cost-benefit variance as impermissible under the statute. We further remand for notice and comment the independent suppliers provision. We also direct the EPA on remand to adhere to the definition of "new facility" set forth in the Phase I Rule or to amend that definition by rulemaking subject to notice and comment. Finally, we dismiss for lack of jurisdiction so much of the petitions as challenges the purported

definition of "Great Lakes" and deny as moot the motions to strike certain material from the record and to supplement the record with other material.

UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT
THURGOOD MARSHALL U.S. COURTHOUSE
40 FOLEY SQUARE
NEW YORK 10007

Catherine O'Hagan Wolfe
CLERK

UNITED STATES COURT OF APPEALS
FILED
JUL 05 2007
Catherine O'Hagen Wolfe, Clerk
SECOND CIRCUIT

Date:
Docket **04-6692-ag**
Short Title: Riverkeeper, Inc. v. EPA
Agency Number: ow-02-0049
Agency: Environmental Protection Agency

At a stated term of the United States Court of Appeals for the Second Circuit, held at the Daniel Patrick Moynihan United States Courthouse, 500 Pearl Street, in the City of New York, on the 5 day of July, two thousand seven.

Riverkeeper, Inc., Natural Resources Defense Council, Waterkeeper Alliance, Soundkeeper, Inc., Scenic

Hudson, Inc., Save The Bay-People for Narragansett Bay, Friends of Casco Bay, American Littoral Society, Delaware Riverkeeper Network, Hackensack Riverkeeper, Inc., New York/New Jersey Baykeeper, Santa Monica Baykeeper, San Diego Baykeeper, California Coastkeeper, Columbia Riverkeeper, Conservation Law Foundation, Surfrider Foundation, State of Rhode Island, State of Connecticut, State of Delaware, Commonwealth of Massachusetts, State of New Jersey, State of New York, Appalachian Power Company, Illinois Energy Association, Utility Water Act Group, PSEG Fossil LLC, PSEG Nuclear LLC, Entergy Corporation,

Petitioners,

v.

United States Environmental Protection Agency, Stephen L. Johnson, in his official capacity as Administrator of the United States Environmental Protection Agency,

Respondents.

A petition for panel rehearing and a petition for rehearing en banc having been filed herein by the petitioners Entergy Corp. Utility Water Act Group, PSEG Fossil LLC., and PSEG Nuclear LLC. Upon consideration by the panel that decided the appeal, it is Ordered that said petition for rehearing is **DENIED**.

It is further noted that the petition for rehearing en banc has been transmitted to the judges for the court in regular active service and to any other judge that

heard the appeal and that no such judge has requested that a vote be taken thereon.

For the Court,
Catherine O'Hagan Wolfe,
Clerk

By:/s/ Catherine O'Hagan Wolfe
Motion Staff Attorney

33 U.S.C. § 1311

§ 1311. Effluent limitations

(a) Illegality of pollutant discharges except in compliance with law

Except as in compliance with this section and sections 1312, 1316, 1317, 1328, 1342, and 1344 of this title, the discharge of any pollutant by any person shall be unlawful.

(b) Timetable for achievement of objectives

In order to carry out the objective of this chapter there shall be achieved—

(1)(A) not later than July 1, 1977, effluent limitations for point sources, other than publicly owned treatment works, (i) which shall require the application of the best practicable control technology currently available as defined by the Administrator pursuant to section 1314(b) of this title, or (ii) in the case of a discharge into a publicly owned treatment works which meets the requirements of subparagraph (B) of this paragraph, which shall require compliance with any applicable pretreatment requirements and any requirements under section 1317 of this title; and

(B) for publicly owned treatment works in existence on July 1, 1977, or approved pursuant to section 1283 of this title prior to June 30, 1974 (for which construction must be completed within four years of approval), effluent limitations based upon secondary treatment as

defined by the Administrator pursuant to section 1314(d)(1) of this title; or,

(C) not later than July 1, 1977, any more stringent limitation, including those necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to any State law or regulations (under authority preserved by section 1370 of this title) or any other Federal law or regulation, or required to implement any applicable water quality standard established pursuant to this chapter.

(2)(A) for pollutants identified in subparagraphs (C), (D), and (F) of this paragraph, effluent limitations for categories and classes of point sources, other than publicly owned treatment works, which (i) shall require application of the best available technology economically achievable for such category or class, which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants, as determined in accordance with regulations issued by the Administrator pursuant to section 1314(b)(2) of this title, which such effluent limitations shall require the elimination of discharges of all pollutants if the Administrator finds, on the basis of information available to him (including information developed pursuant to section 1325 of this title), that such elimination is technologically and economically achievable for a category or class of point sources as determined in accordance with regulations issued by the Administrator pursuant to section 1314(b)(2) of this title, or (ii) in the case of the introduction of a pollutant into a publicly owned treatment works which meets the requirements of subparagraph (B) of this paragraph, shall require compliance with any applicable

pretreatment requirements and any other requirement under section 1317 of this title;

(B) Repealed. Pub. L. 97-117, § 21(b), Dec. 29, 1981, 95 Stat. 1632.

(C) with respect to all toxic pollutants referred to in table 1 of Committee Print Numbered 95-30 of the Committee on Public Works and Transportation of the House of Representatives compliance with effluent limitations in accordance with subparagraph (A) of this paragraph as expeditiously as practicable but in no case later than three years after the date such limitations are promulgated under section 1314(b) of this title, and in no case later than March 31, 1989;

(D) for all toxic pollutants listed under paragraph (1) of subsection (a) of section 1317 of this title which are not referred to in subparagraph (C) of this paragraph compliance with effluent limitations in accordance with subparagraph (A) of this paragraph as expeditiously as practicable, but in no case later than three years after the date such limitations are promulgated under section 1314(b) of this title, and in no case later than March 31, 1989;

(E) as expeditiously as practicable but in no case later than three years after the date such limitations are promulgated under section 1314(b) of this title, and in no case later than March 31, 1989, compliance with effluent limitations for categories and classes of point sources, other than publicly owned treatment works, which in the case of pollutants identified pursuant to section 1314(a)(4) of this title shall require application of the best conventional pollutant control technology as determined in accordance with regulations issued by

the Administrator pursuant to section 1314(b)(4) of this title; and

(F) for all pollutants (other than those subject to subparagraphs (C), (D), or (E) of this paragraph) compliance with effluent limitations in accordance with subparagraph (A) of this paragraph as expeditiously as practicable but in no case later than 3 years after the date such limitations are established, and in no case later than March 31, 1989.

(3)(A) for effluent limitations under paragraph (1)(A)(i) of this subsection promulgated after January 1, 1982, and requiring a level of control substantially greater or based on fundamentally different control technology than under permits for an industrial category issued before such date, compliance as expeditiously as practicable but in no case later than three years after the date such limitations are promulgated under section 1314(b) of this title, and in no case later than March 31, 1989; and

(B) for any effluent limitation in accordance with paragraph (1)(A)(i), (2)(A)(i), or (2)(E) of this subsection established only on the basis of section 1342(a)(1) of this title in a permit issued after February 4, 1987, compliance as expeditiously as practicable but in no case later than three years after the date such limitations are established, and in no case later than March 31, 1989.

(c) Modification of timetable

The Administrator may modify the requirements of subsection (b)(2)(A) of this section with respect to any

point source for which a permit application is filed after July 1, 1977, upon a showing by the owner or operator of such point source satisfactory to the Administrator that such modified requirements (1) will represent the maximum use of technology within the economic capability of the owner or operator; and (2) will result in reasonable further progress toward the elimination of the discharge of pollutants.

(d) Review and revision of effluent limitations

Any effluent limitation required by paragraph (2) of subsection (b) of this section shall be reviewed at least every five years and, if appropriate, revised pursuant to the procedure established under such paragraph.

(e) All point discharge source application of effluent limitations

Effluent limitations established pursuant to this section or section 1312 of this title shall be applied to all point sources of discharge of pollutants in accordance with the provisions of this chapter.

(f) Illegality of discharge of radiological, chemical, or biological warfare agents, high-level radioactive waste, or medical waste

Notwithstanding any other provisions of this chapter it shall be unlawful to discharge any radiological, chemical, or biological warfare agent, any high-level radioactive waste, or any medical waste, into the navigable waters.

(g) Modifications for certain nonconventional pollutants

(1) General authority

The Administrator, with the concurrence of the State, may modify the requirements of subsection (b)(2)(A) of this section with respect to the discharge from any point source of ammonia, chlorine, color, iron, and total phenols (4AAP) (when determined by the Administrator to be a pollutant covered by subsection (b)(2)(F) of this section) and any other pollutant which the Administrator lists under paragraph (4) of this subsection.

(2) Requirements for granting modifications

A modification under this subsection shall be granted only upon a showing by the owner or operator of a point source satisfactory to the Administrator that—

(A) such modified requirements will result at a minimum in compliance with the requirements of subsection (b)(1)(A) or (C) of this section, whichever is applicable;

(B) such modified requirements will not result in any additional requirements on any other point or nonpoint source; and

(C) such modification will not interfere with the attainment or maintenance of that water quality which shall assure protection of public water supplies, and the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities, in and on the water and such modification will not result in the discharge of pollutants in

quantities which may reasonably be anticipated to pose an unacceptable risk to human health or the environment because of bioaccumulation, persistency in the environment, acute toxicity, chronic toxicity (including carcinogenicity, mutagenicity or teratogenicity), or synergistic propensities.

(3) Limitation on authority to apply for subsection (c) modification

If an owner or operator of a point source applies for a modification under this subsection with respect to the discharge of any pollutant, such owner or operator shall be eligible to apply for modification under subsection (c) of this section with respect to such pollutant only during the same time period as he is eligible to apply for a modification under this subsection.

(4) Procedures for listing additional pollutants

(A) General authority

Upon petition of any person, the Administrator may add any pollutant to the list of pollutants for which modification under this section is authorized (except for pollutants identified pursuant to section 1314(a)(4) of this title, toxic pollutants subject to section 1317(a) of this title, and the thermal component of discharges) in accordance with the provisions of this paragraph.

(B) Requirements for listing

(i) Sufficient information

The person petitioning for listing of an additional pollutant under this subsection shall submit to the

Administrator sufficient information to make the determinations required by this subparagraph.

(ii) Toxic criteria determination

The Administrator shall determine whether or not the pollutant meets the criteria for listing as a toxic pollutant under section 1317(a) of this title.

(iii) Listing as toxic pollutant

If the Administrator determines that the pollutant meets the criteria for listing as a toxic pollutant under section 1317(a) of this title, the Administrator shall list the pollutant as a toxic pollutant under section 1317(a) of this title.

(iv) Nonconventional criteria determination

If the Administrator determines that the pollutant does not meet the criteria for listing as a toxic pollutant under such section and determines that adequate test methods and sufficient data are available to make the determinations required by paragraph (2) of this subsection with respect to the pollutant, the Administrator shall add the pollutant to the list of pollutants specified in paragraph (1) of this subsection for which modifications are authorized under this subsection.

(C) Requirements for filing of petitions

A petition for listing of a pollutant under this paragraph—

(i) must be filed not later than 270 days after the date of promulgation of an applicable effluent guideline under section 1314 of this title;

(ii) may be filed before promulgation of such guideline; and

(iii) may be filed with an application for a modification under paragraph (1) with respect to the discharge of such pollutant.

(D) Deadline for approval of petition

A decision to add a pollutant to the list of pollutants for which modifications under this subsection are authorized must be made within 270 days after the date of promulgation of an applicable effluent guideline under section 1314 of this title.

(E) Burden of proof

The burden of proof for making the determinations under subparagraph (B) shall be on the petitioner.

(5) Removal of pollutants

The Administrator may remove any pollutant from the list of pollutants for which modifications are authorized under this subsection if the Administrator determines that adequate test methods and sufficient data are no longer available for determining whether or not modifications may be granted with respect to such pollutant under paragraph (2) of this subsection.

(h) Modification of secondary treatment requirements

The Administrator, with the concurrence of the State, may issue a permit under section 1342 of this title which modifies the requirements of subsection (b)(1)(B) of this section with respect to the discharge of any pollutant from a publicly owned treatment works into marine waters, if the applicant demonstrates to the satisfaction of the Administrator that—

(1) there is an applicable water quality standard specific to the pollutant for which the modification is requested, which has been identified under section 1314(a)(6) of this title;

(2) the discharge of pollutants in accordance with such modified requirements will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife, and allows recreational activities, in and on the water;

(3) the applicant has established a system for monitoring the impact of such discharge on a representative sample of aquatic biota, to the extent practicable, and the scope of such monitoring is limited to include only those scientific investigations which are necessary to study the effects of the proposed discharge;

(4) such modified requirements will not result in any additional requirements on any other point or nonpoint source;

(5) all applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced;

(6) in the case of any treatment works serving a population of 50,000 or more, with respect to any toxic pollutant introduced into such works by an industrial discharger for which pollutant there is no applicable pretreatment requirement in effect, sources introducing waste into such works are in compliance with all applicable pretreatment requirements, the applicant will enforce such requirements, and the applicant has in effect a pretreatment program which, in combination with the treatment of discharges from such works, removes the same amount of such pollutant as would be removed if such works were to apply secondary treatment to discharges and if such works had no pretreatment program with respect to such pollutant;

(7) to the extent practicable, the applicant has established a schedule of activities designed to eliminate the entrance of toxic pollutants from nonindustrial sources into such treatment works;

(8) there will be no new or substantially increased discharges from the point source of the pollutant to which the modification applies above that volume of discharge specified in the permit;

(9) the applicant at the time such modification becomes effective will be discharging effluent which has received at least primary or equivalent treatment and which meets the criteria established under section 1314(a)(1) of this title after initial mixing in the waters

surrounding or adjacent to the point at which such effluent is discharged.

For the purposes of this subsection the phrase "the discharge of any pollutant into marine waters" refers to a discharge into deep waters of the territorial sea or the waters of the contiguous zone, or into saline estuarine waters where there is strong tidal movement and other hydrological and geological characteristics which the Administrator determines necessary to allow compliance with paragraph (2) of this subsection, and section 1251(a)(2) of this title. For the purposes of paragraph (9), "primary or equivalent treatment" means treatment by screening, sedimentation, and skimming adequate to remove at least 30 percent of the biological oxygen demanding material and of the suspended solids in the treatment works influent, and disinfection, where appropriate. A municipality which applies secondary treatment shall be eligible to receive a permit pursuant to this subsection which modifies the requirements of subsection (b)(1)(B) of this section with respect to the discharge of any pollutant from any treatment works owned by such municipality into marine waters. No permit issued under this subsection shall authorize the discharge of sewage sludge into marine waters. In order for a permit to be issued under this subsection for the discharge of a pollutant into marine waters, such marine waters must exhibit characteristics assuring that water providing dilution does not contain significant amounts of previously discharged effluent from such treatment works. No permit issued under this subsection shall authorize the discharge of any pollutant into saline estuarine waters which at the time of application do not support a balanced indigenous population of shellfish, fish and wildlife, or allow recreation in and on the waters or

which exhibit ambient water quality below applicable water quality standards adopted for the protection of public water supplies, shellfish, fish and wildlife or recreational activities or such other standards necessary to assure support and protection of such uses. The prohibition contained in the preceding sentence shall apply without regard to the presence or absence of a causal relationship between such characteristics and the applicant's current or proposed discharge. Notwithstanding any other provisions of this subsection, no permit may be issued under this subsection for discharge of a pollutant into the New York Bight Apex consisting of the ocean waters of the Atlantic Ocean westward of 73 degrees 30 minutes west longitude and northward of 40 degrees 10 minutes north latitude.

(i) Municipal time extensions

(1) Where construction is required in order for a planned or existing publicly owned treatment works to achieve limitations under subsection (b)(1)(B) or (b)(1)(C) of this section, but (A) construction cannot be completed within the time required in such subsection, or (B) the United States has failed to make financial assistance under this chapter available in time to achieve such limitations by the time specified in such subsection, the owner or operator of such treatment works may request the Administrator (or if appropriate the State) to issue a permit pursuant to section 1342 of this title or to modify a permit issued pursuant to that section to extend such time for compliance. Any such request shall be filed with the Administrator (or if appropriate the State) within 180 days after February 4, 1987. The Administrator (or if

appropriate the State) may grant such request and issue or modify such a permit, which shall contain a schedule of compliance for the publicly owned treatment works based on the earliest date by which such financial assistance will be available from the United States and construction can be completed, but in no event later than July 1, 1988, and shall contain such other terms and conditions, including those necessary to carry out subsections (b) through (g) of section 1281 of this title, section 1317 of this title, and such interim effluent limitations applicable to that treatment works as the Administrator determines are necessary to carry out the provisions of this chapter.

(2)(A) Where a point source (other than a publicly owned treatment works) will not achieve the requirements of subsections (b)(1)(A) and (b)(1)(C) of this section and—

(i) if a permit issued prior to July 1, 1977, to such point source is based upon a discharge into a publicly owned treatment works; or

(ii) if such point source (other than a publicly owned treatment works) had before July 1, 1977, a contract (enforceable against such point source) to discharge into a publicly owned treatment works; or

(iii) if either an application made before July 1, 1977, for a construction grant under this chapter for a publicly owned treatment works, or engineering or architectural plans or working drawings made before July 1, 1977, for a publicly owned treatment works, show that such point source was to discharge into such publicly owned treatment works,

and such publicly owned treatment works is presently unable to accept such discharge without construction, and in the case of a discharge to an existing publicly owned treatment works, such treatment works has an extension pursuant to paragraph (1) of this subsection, the owner or operator of such point source may request the Administrator (or if appropriate the State) to issue or modify such a permit pursuant to such section 1342 of this title to extend such time for compliance. Any such request shall be filed with the Administrator (or if appropriate the State) within 180 days after December 27, 1977, or the filing of a request by the appropriate publicly owned treatment works under paragraph (1) of this subsection, whichever is later. If the Administrator (or if appropriate the State) finds that the owner or operator of such point source has acted in good faith, he may grant such request and issue or modify such a permit, which shall contain a schedule of compliance for the point source to achieve the requirements of subsections (b)(1)(A) and (C) of this section and shall contain such other terms and conditions, including pretreatment and interim effluent limitations and water conservation requirements applicable to that point source, as the Administrator determines are necessary to carry out the provisions of this chapter.

(B) No time modification granted by the Administrator (or if appropriate the State) pursuant to paragraph (2)(A) of this subsection shall extend beyond the earliest date practicable for compliance or beyond the date of any extension granted to the appropriate publicly owned treatment works pursuant to paragraph (1) of this subsection, but in no event shall it extend beyond July 1, 1988; and no such time modification shall be granted unless (i) the publicly

owned treatment works will be in operation and available to the point source before July 1, 1988, and will meet the requirements of subsections (b)(1)(B) and (C) of this section after receiving the discharge from that point source; and (ii) the point source and the publicly owned treatment works have entered into an enforceable contract requiring the point source to discharge into the publicly owned treatment works, the owner or operator of such point source to pay the costs required under section 1284 of this title, and the publicly owned treatment works to accept the discharge from the point source; and (iii) the permit for such point source requires that point source to meet all requirements under section 1317(a) and (b) of this title during the period of such time modification.

(j) Modification procedures

(1) Any application filed under this section for a modification of the provisions of—

(A) subsection (b)(1)(B) of this section under subsection (h) of this section shall be filed not later that [FN1] the 365th day which begins after December 29, 1981, except that a publicly owned treatment works which prior to December 31, 1982, had a contractual arrangement to use a portion of the capacity of an ocean outfall operated by another publicly owned treatment works which has applied for or received modification under subsection (h) of this section, may apply for a modification of subsection (h) of this section in its own right not later than 30 days after February 4, 1987, and except as provided in paragraph (5);

(B) subsection (b)(2)(A) of this section as it applies to pollutants identified in subsection (b)(2)(F) of this section shall be filed not later than 270 days after the date of promulgation of an applicable effluent guideline under section 1314 of this title or not later than 270 days after December 27, 1977, whichever is later.

(2) Subject to paragraph (3) of this section, any application for a modification filed under subsection (g) of this section shall not operate to stay any requirement under this chapter, unless in the judgment of the Administrator such a stay or the modification sought will not result in the discharge of pollutants in quantities which may reasonably be anticipated to pose an unacceptable risk to human health or the environment because of bioaccumulation, persistency in the environment, acute toxicity, chronic toxicity (including carcinogenicity, mutagenicity, or teratogenicity), or synergistic propensities, and that there is a substantial likelihood that the applicant will succeed on the merits of such application. In the case of an application filed under subsection (g) of this section, the Administrator may condition any stay granted under this paragraph on requiring the filing of a bond or other appropriate security to assure timely compliance with the requirements from which a modification is sought.

(3) Compliance requirements under subsection (g)

(A) Effect of filing

An application for a modification under subsection (g) of this section and a petition for listing of a pollutant as a pollutant for which modifications are authorized

under such subsection shall not stay the requirement that the person seeking such modification or listing comply with effluent limitations under this chapter for all pollutants not the subject of such application or petition.

(B) Effect of disapproval

Disapproval of an application for a modification under subsection (g) of this section shall not stay the requirement that the person seeking such modification comply with all applicable effluent limitations under this chapter.

(4) Deadline for subsection (g) decision

An application for a modification with respect to a pollutant filed under subsection (g) of this section must be approved or disapproved not later than 365 days after the date of such filing; except that in any case in which a petition for listing such pollutant as a pollutant for which modifications are authorized under such subsection is approved, such application must be approved or disapproved not later than 365 days after the date of approval of such petition.

(5) Extension of application deadline

(A) In general

In the 180-day period beginning on October 31, 1994, the city of San Diego, California, may apply for a modification pursuant to subsection (h) of this section of the requirements of subsection (b)(1)(B) of this section with respect to biological oxygen demand and

total suspended solids in the effluent discharged into marine waters.

(B) Application

An application under this paragraph shall include a commitment by the applicant to implement a waste water reclamation program that, at a minimum, will—

(i) achieve a system capacity of 45,000,000 gallons of reclaimed waste water per day by January 1, 2010; and

(ii) result in a reduction in the quantity of suspended solids discharged by the applicant into the marine environment during the period of the modification.

(C) Additional conditions

The Administrator may not grant a modification pursuant to an application submitted under this paragraph unless the Administrator determines that such modification will result in removal of not less than 58 percent of the biological oxygen demand (on an annual average) and not less than 80 percent of total suspended solids (on a monthly average) in the discharge to which the application applies.

(D) Preliminary decision deadline

The Administrator shall announce a preliminary decision on an application submitted under this paragraph not later than 1 year after the date the application is submitted.

(k) Innovative technology

In the case of any facility subject to a permit under section 1342 of this title which proposes to comply with the requirements of subsection (b)(2)(A) or (b)(2)(E) of this section by replacing existing production capacity with an innovative production process which will result in an effluent reduction significantly greater than that required by the limitation otherwise applicable to such facility and moves toward the national goal of eliminating the discharge of all pollutants, or with the installation of an innovative control technique that has a substantial likelihood for enabling the facility to comply with the applicable effluent limitation by achieving a significantly greater effluent reduction than that required by the applicable effluent limitation and moves toward the national goal of eliminating the discharge of all pollutants, or by achieving the required reduction with an innovative system that has the potential for significantly lower costs than the systems which have been determined by the Administrator to be economically achievable, the Administrator (or the State with an approved program under section 1342 of this title, in consultation with the Administrator) may establish a date for compliance under subsection (b)(2)(A) or (b)(2)(E) of this section no later than two years after the date for compliance with such effluent limitation which would otherwise be applicable under such subsection, if it is also determined that such innovative system has the potential for industrywide application.

(l) Toxic pollutants

Other than as provided in subsection (n) of this section, the Administrator may not modify any requirement of this section as it applies to any specific pollutant which

is on the toxic pollutant list under section 1317(a)(1) of this title.

(m) Modification of effluent limitation requirements for point sources

(1) The Administrator, with the concurrence of the State, may issue a permit under section 1342 of this title which modifies the requirements of subsections (b)(1)(A) and (b)(2)(E) of this section, and of section 1343 of this title, with respect to effluent limitations to the extent such limitations relate to biochemical oxygen demand and pH from discharges by an industrial discharger in such State into deep waters of the territorial seas, if the applicant demonstrates and the Administrator finds that--

(A) the facility for which modification is sought is covered at the time of the enactment of this subsection by National Pollutant Discharge Elimination System permit number CA0005894 or CA0005282;

(B) the energy and environmental costs of meeting such requirements of subsections (b)(1)(A) and (b)(2)(E) of this section and section 1343 of this title exceed by an unreasonable amount the benefits to be obtained, including the objectives of this chapter;

(C) the applicant has established a system for monitoring the impact of such discharges on a representative sample of aquatic biota;

(D) such modified requirements will not result in any additional requirements on any other point or nonpoint source;

(E) there will be no new or substantially increased discharges from the point source of the pollutant to which the modification applies above that volume of discharge specified in the permit;

(F) the discharge is into waters where there is strong tidal movement and other hydrological and geological characteristics which are necessary to allow compliance with this subsection and section 1251(a)(2) of this title;

(G) the applicant accepts as a condition to the permit a contractural [FN2] obligation to use funds in the amount required (but not less than $250,000 per year for ten years) for research and development of water pollution control technology, including but not limited to closed cycle technology;

(H) the facts and circumstances present a unique situation which, if relief is granted, will not establish a precedent or the relaxation of the requirements of this chapter applicable to similarly situated discharges; and

(I) no owner or operator of a facility comparable to that of the applicant situated in the United States has demonstrated that it would be put at a competitive disadvantage to the applicant (or the parent company or any subsidiary thereof) as a result of the issuance of a permit under this subsection.

(2) The effluent limitations established under a permit issued under paragraph (1) shall be sufficient to implement the applicable State water quality standards, to assure the protection of public water supplies and protection and propagation of a balanced, indigenous population of shellfish, fish, fauna, wildlife, and other aquatic organisms, and to allow recreational

activities in and on the water. In setting such limitations, the Administrator shall take into account any seasonal variations and the need for an adequate margin of safety, considering the lack of essential knowledge concerning the relationship between effluent limitations and water quality and the lack of essential knowledge of the effects of discharges on beneficial uses of the receiving waters.

(3) A permit under this subsection may be issued for a period not to exceed five years, and such a permit may be renewed for one additional period not to exceed five years upon a demonstration by the applicant and a finding by the Administrator at the time of application for any such renewal that the provisions of this subsection are met.

(4) The Administrator may terminate a permit issued under this subsection if the Administrator determines that there has been a decline in ambient water quality of the receiving waters during the period of the permit even if a direct cause and effect relationship cannot be shown: Provided, That if the effluent from a source with a permit issued under this subsection is contributing to a decline in ambient water quality of the receiving waters, the Administrator shall terminate such permit.

(n) Fundamentally different factors

(1) General rule

The Administrator, with the concurrence of the State, may establish an alternative requirement under subsection (b)(2) of this section or section 1317(b) of

this title for a facility that modifies the requirements of national effluent limitation guidelines or categorical pretreatment standards that would otherwise be applicable to such facility, if the owner or operator of such facility demonstrates to the satisfaction of the Administrator that—

(A) the facility is fundamentally different with respect to the factors (other than cost) specified in section 1314(b) or 1314(g) of this title and considered by the Administrator in establishing such national effluent limitation guidelines or categorical pretreatment standards;

(B) the application—

(i) is based solely on information and supporting data submitted to the Administrator during the rulemaking for establishment of the applicable national effluent limitation guidelines or categorical pretreatment standard specifically raising the factors that are fundamentally different for such facility; or

(ii) is based on information and supporting data referred to in clause (i) and information and supporting data the applicant did not have a reasonable opportunity to submit during such rulemaking;

(C) the alternative requirement is no less stringent than justified by the fundamental difference; and

(D) the alternative requirement will not result in a non-water quality environmental impact which is markedly more adverse than the impact considered by the Administrator in establishing such national effluent

limitation guideline or categorical pretreatment standard.

(2) Time limit for applications

An application for an alternative requirement which modifies the requirements of an effluent limitation or pretreatment standard under this subsection must be submitted to the Administrator within 180 days after the date on which such limitation or standard is established or revised, as the case may be.

(3) Time limit for decision

The Administrator shall approve or deny by final agency action an application submitted under this subsection within 180 days after the date such application is filed with the Administrator.

(4) Submission of information

The Administrator may allow an applicant under this subsection to submit information and supporting data until the earlier of the date the application is approved or denied or the last day that the Administrator has to approve or deny such application.

(5) Treatment of pending applications

For the purposes of this subsection, an application for an alternative requirement based on fundamentally different factors which is pending on February 4, 1987, shall be treated as having been submitted to the Administrator on the 180th day following February 4, 1987. The applicant may amend the application to take into account the provisions of this subsection.

(6) Effect of submission of application

An application for an alternative requirement under this subsection shall not stay the applicant's obligation to comply with the effluent limitation guideline or categorical pretreatment standard which is the subject of the application.

(7) Effect of denial

If an application for an alternative requirement which modifies the requirements of an effluent limitation or pretreatment standard under this subsection is denied by the Administrator, the applicant must comply with such limitation or standard as established or revised, as the case may be.

(8) Reports

By January 1, 1997, and January 1 of every odd-numbered year thereafter, the Administrator shall submit to the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives a report on the status of applications for alternative requirements which modify the requirements of effluent limitations under section 1311 or 1314 of this title or any national categorical pretreatment standard under section 1317(b) of this title filed before, on, or after February 4, 1987.

(o) Application fees

The Administrator shall prescribe and collect from each applicant fees reflecting the reasonable administrative costs incurred in reviewing and processing applications for modifications submitted to the Administrator pursuant to subsections (c), (g), (i), (k), (m), and (n) of this section, section 1314(d)(4) of this title, and section 1326(a) of this title. All amounts collected by the Administrator under this subsection shall be deposited into a special fund of the Treasury entitled "Water Permits and Related Services" which shall thereafter be available for appropriation to carry out activities of the Environmental Protection Agency for which such fees were collected.

(p) Modified permit for coal remining operations

(1) In general

Subject to paragraphs (2) through (4) of this subsection, the Administrator, or the State in any case which the State has an approved permit program under section 1342(b) of this title, may issue a permit under section 1342 of this title which modifies the requirements of subsection (b)(2)(A) of this section with respect to the pH level of any pre-existing discharge, and with respect to pre-existing discharges of iron and manganese from the remined area of any coal remining operation or with respect to the pH level or level of iron or manganese in any pre-existing discharge affected by the remining operation. Such modified requirements shall apply the best available technology economically achievable on a case-by-case

basis, using best professional judgment, to set specific numerical effluent limitations in each permit.

(2) Limitations

The Administrator or the State may only issue a permit pursuant to paragraph (1) if the applicant demonstrates to the satisfaction of the Administrator or the State, as the case may be, that the coal remining operation will result in the potential for improved water quality from the remining operation but in no event shall such a permit allow the pH level of any discharge, and in no event shall such a permit allow the discharges of iron and manganese, to exceed the levels being discharged from the remined area before the coal remining operation begins. No discharge from, or affected by, the remining operation shall exceed State water quality standards established under section 1313 of this title.

(3) Definitions

For purposes of this subsection—

(A) Coal remining operation

The term "coal remining operation" means a coal mining operation which begins after February 4, 1987 at a site on which coal mining was conducted before August 3, 1977.

(B) Remined area

The term "remined area" means only that area of any coal remining operation on which coal mining was conducted before August 3, 1977.

(C) Pre-existing discharge

The term "pre-existing discharge" means any discharge at the time of permit application under this subsection.

(4) Applicability of strip mining laws

Nothing in this subsection shall affect the application of the Surface Mining Control and Reclamation Act of 1977 [30 U.S.C.A. § 1201 et seq.] to any coal remining operation, including the application of such Act to suspended solids.

[FN1] So in original. Probably should be "than".

[FN2] So in original. Probably should be "contractual".

33 U.S.C. § 1314

§ 1314. Information and guidelines

(a) Criteria development and publication

(1) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall develop and publish, within one year after October 18, 1972 (and from time to time thereafter revise) criteria for water quality accurately reflecting the latest scientific knowledge (A) on the kind and extent of all identifiable effects on health and welfare including, but not limited to, plankton, fish, shellfish, wildlife, plant life, shorelines, beaches, esthetics, and recreation which may be expected from the presence of pollutants in any body of water, including ground water; (B) on the concentration and dispersal of pollutants, or their byproducts, through biological, physical, and chemical processes; and (C) on the effects of pollutants on biological community diversity, productivity, and stability, including information on the factors affecting rates of eutrophication and rates of organic and inorganic sedimentation for varying types of receiving waters.

(2) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall develop and publish, within one year after October 18, 1972 (and from time to time thereafter revise) information (A) on the factors necessary to restore and maintain the chemical, physical, and biological integrity of all navigable waters, ground waters, waters of the contiguous zone, and the oceans; (B) on the factors necessary for the protection and propagation of shellfish, fish, and

wildlife for classes and categories of receiving waters and to allow recreational activities in and on the water; and (C) on the measurement and classification of water quality; and (D) for the purpose of section 1313 of this title, on and the identification of pollutants suitable for maximum daily load measurement correlated with the achievement of water quality objectives.

(3) Such criteria and information and revisions thereof shall be issued to the States and shall be published in the Federal Register and otherwise made available to the public.

(4) The Administrator shall, within 90 days after December 27, 1977, and from time to time thereafter, publish and revise as appropriate information identifying conventional pollutants, including but not limited to, pollutants classified as biological oxygen demanding, suspended solids, fecal coliform, and pH. The thermal component of any discharge shall not be identified as a conventional pollutant under this paragraph.

(5)(A) The Administrator, to the extent practicable before consideration of any request under section 1311(g) of this title and within six months after December 27, 1977, shall develop and publish information on the factors necessary for the protection of public water supplies, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and to allow recreational activities, in and on the water.

(B) The Administrator, to the extent practicable before consideration of any application under section 1311(h) of this title and within six months after December 27,

1977, shall develop and publish information on the factors necessary for the protection of public water supplies, and the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife, and to allow recreational activities, in and on the water.

(6) The Administrator shall, within three months after December 27, 1977, and annually thereafter, for purposes of section 1311(h) of this title publish and revise as appropriate information identifying each water quality standard in effect under this chapter or State law, the specific pollutants associated with such water quality standard, and the particular waters to which such water quality standard applies.

(7) Guidance to states

The Administrator, after consultation with appropriate State agencies and on the basis of criteria and information published under paragraphs (1) and (2) of this subsection, shall develop and publish, within 9 months after February 4, 1987, guidance to the States on performing the identification required by subsection (l)(1) of this section.

(8) Information on water quality criteria

The Administrator, after consultation with appropriate State agencies and within 2 years after February 4, 1987, shall develop and publish information on methods for establishing and measuring water quality criteria for toxic pollutants on other bases than pollutant-by-pollutant criteria, including biological monitoring and assessment methods.

(9) Revised criteria for coastal recreation waters

(A) In general

Not later than 5 years after October 10, 2000, after consultation and in cooperation with appropriate Federal, State, tribal, and local officials (including local health officials), the Administrator shall publish new or revised water quality criteria for pathogens and pathogen indicators (including a revised list of testing methods, as appropriate), based on the results of the studies conducted under section 1254(v) of this title, for the purpose of protecting human health in coastal recreation waters.

(B) Reviews

Not later than the date that is 5 years after the date of publication of water quality criteria under this paragraph, and at least once every 5 years thereafter, the Administrator shall review and, as necessary, revise the water quality criteria.

(b) Effluent limitation guidelines

For the purpose of adopting or revising effluent limitations under this chapter the Administrator shall, after consultation with appropriate Federal and State agencies and other interested persons, publish within one year of October 18, 1972, regulations, providing guidelines for effluent limitations, and, at least annually thereafter, revise, if appropriate, such regulations. Such regulations shall—

(1)(A) identify, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, the degree of effluent reduction attainable through the application of the best practicable control technology currently available for classes and categories of point sources (other than publicly owned treatment works); and

(B) specify factors to be taken into account in determining the control measures and practices to be applicable to point sources (other than publicly owned treatment works) within such categories or classes. Factors relating to the assessment of best practicable control technology currently available to comply with subsection (b)(1) of section 1311 of this title shall include consideration of the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application, and shall also take into account the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, non-water quality environmental impact (including energy requirements), and such other factors as the Administrator deems appropriate;

(2)(A) identify, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, the degree of effluent reduction attainable through the application of the best control measures and practices achievable including treatment techniques, process and procedure innovations, operating methods, and other alternatives for classes and categories of point sources (other than publicly owned treatment works); and

(B) specify factors to be taken into account in determining the best measures and practices available to comply with subsection (b)(2) of section 1311 of this title to be applicable to any point source (other than publicly owned treatment works) within such categories or classes. Factors relating to the assessment of best available technology shall take into account the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, the cost of achieving such effluent reduction, non-water quality environmental impact (including energy requirements), and such other factors as the Administrator deems appropriate;

(3) identify control measures and practices available to eliminate the discharge of pollutants from categories and classes of point sources, taking into account the cost of achieving such elimination of the discharge of pollutants; and

(4)(A) identify, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, the degree of effluent reduction attainable through the application of the best conventional pollutant control technology (including measures and practices) for classes and categories of point sources (other than publicly owned treatment works); and

(B) specify factors to be taken into account in determining the best conventional pollutant control technology measures and practices to comply with section 1311(b)(2)(E) of this title to be applicable to any point source (other than publicly owned treatment works) within such categories or classes. Factors relating to the assessment of best conventional

pollutant control technology (including measures and practices) shall include consideration of the reasonableness of the relationship between the costs of attaining a reduction in effluents and the effluent reduction benefits derived, and the comparison of the cost and level of reduction of such pollutants from the discharge from publicly owned treatment works to the cost and level of reduction of such pollutants from a class or category of industrial sources, and shall take into account the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, non-water quality environmental impact (including energy requirements), and such other factors as the Administrator deems appropriate.

(c) Pollution discharge elimination procedures

The Administrator, after consultation, with appropriate Federal and State agencies and other interested persons, shall issue to the States and appropriate water pollution control agencies within 270 days after October 18, 1972 (and from time to time thereafter) information on the processes, procedures, or operating methods which result in the elimination or reduction of the discharge of pollutants to implement standards of performance under section 1316 of this title. Such information shall include technical and other data, including costs, as are available on alternative methods of elimination or reduction of the discharge of pollutants. Such information, and revisions thereof, shall be published in the Federal Register and otherwise shall be made available to the public.

(d) Secondary treatment information; alternative waste treatment management techniques; innovative and alternative wastewater treatment processes; facilities deemed equivalent of secondary treatment

(1) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall publish within sixty days after October 18, 1972 (and from time to time thereafter) information, in terms of amounts of constituents and chemical, physical, and biological characteristics of pollutants, on the degree of effluent reduction attainable through the application of secondary treatment.

(2) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall publish within nine months after October 18, 1972 (and from time to time thereafter) information on alternative waste treatment management techniques and systems available to implement section 1281 of this title.

(3) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall promulgate within one hundred and eighty days after December 27, 1977, guidelines for identifying and evaluating innovative and alternative wastewater treatment processes and techniques referred to in section 1281(g)(5) of this title.

(4) For the purposes of this subsection, such biological treatment facilities as oxidation ponds, lagoons, and ditches and trickling filters shall be deemed the equivalent of secondary treatment. The Administrator

shall provide guidance under paragraph (1) of this subsection on design criteria for such facilities, taking into account pollutant removal efficiencies and, consistent with the objectives of this chapter, assuring that water quality will not be adversely affected by deeming such facilities as the equivalent of secondary treatment.

(e) Best management practices for industry

The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, may publish regulations, supplemental to any effluent limitations specified under subsections (b) and (c) of this section for a class or category of point sources, for any specific pollutant which the Administrator is charged with a duty to regulate as a toxic or hazardous pollutant under section 1317(a)(1) or 1321 of this title, to control plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage which the Administrator determines are associated with or ancillary to the industrial manufacturing or treatment process within such class or category of point sources and may contribute significant amounts of such pollutants to navigable waters. Any applicable controls established under this subsection shall be included as a requirement for the purposes of section 1311, 1312, 1316, 1317, or 1343 of this title, as the case may be, in any permit issued to a point source pursuant to section 1342 of this title.

(f) Identification and evaluation of nonpoint sources of pollution; processes, procedures, and methods to control pollution

The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall issue to appropriate Federal agencies, the States, water pollution control agencies, and agencies designated under section 1288 of this title, within one year after October 18, 1972 (and from time to time thereafter) information including (1) guidelines for identifying and evaluating the nature and extent of nonpoint sources of pollutants, and (2) processes, procedures, and methods to control pollution resulting from—

(A) agricultural and silvicultural activities, including runoff from fields and crop and forest lands;

(B) mining activities, including runoff and siltation from new, currently operating, and abandoned surface and underground mines;

(C) all construction activity, including runoff from the facilities resulting from such construction;

(D) the disposal of pollutants in wells or in subsurface excavations;

(E) salt water intrusion resulting from reductions of fresh water flow from any cause, including extraction of ground water, irrigation, obstruction, and diversion; and

(F) changes in the movement, flow, or circulation of any navigable waters or ground waters, including changes caused by the construction of dams, levees, channels, causeways, or flow diversion facilities.

Such information and revisions thereof shall be published in the Federal Register and otherwise made available to the public.

(g) Guidelines for pretreatment of pollutants

(1) For the purpose of assisting States in carrying out programs under section 1342 of this title, the Administrator shall publish, within one hundred and twenty days after October 18, 1972, and review at least annually thereafter and, if appropriate, revise guidelines for pretreatment of pollutants which he determines are not susceptible to treatment by publicly owned treatment works. Guidelines under this subsection shall be established to control and prevent the discharge into the navigable waters, the contiguous zone, or the ocean (either directly or through publicly owned treatment works) of any pollutant which interferes with, passes through, or otherwise is incompatible with such works.

(2) When publishing guidelines under this subsection, the Administrator shall designate the category or categories of treatment works to which the guidelines shall apply.

(h) Test procedures guidelines

The Administrator shall, within one hundred and eighty days from October 18, 1972, promulgate guidelines establishing test procedures for the analysis of pollutants that shall include the factors which must be provided in any certification pursuant to section

1341 of this title or permit application pursuant to section 1342 of this title.

(i) Guidelines for monitoring, reporting, enforcement, funding, personnel, and manpower

The Administrator shall (1) within sixty days after October 18, 1972, promulgate guidelines for the purpose of establishing uniform application forms and other minimum requirements for the acquisition of information from owners and operators of point-sources of discharge subject to any State program under section 1342 of this title, and (2) within sixty days from October 18, 1972, promulgate guidelines establishing the minimum procedural and other elements of any State program under section 1342 of this title, which shall include:

(A) monitoring requirements;

(B) reporting requirements (including procedures to make information available to the public);

(C) enforcement provisions; and

(D) funding, personnel qualifications, and manpower requirements (including a requirement that no board or body which approves permit applications or portions thereof shall include, as a member, any person who receives, or has during the previous two years received, a significant portion of his income directly or indirectly from permit holders or applicants for a permit).

(j) Lake restoration guidance manual

The Administrator shall, within 1 year after February 4, 1987, and biennially thereafter, publish and disseminate a lake restoration guidance manual describing methods, procedures, and processes to guide State and local efforts to improve, restore, and enhance water quality in the Nation's publicly owned lakes.

(k) Agreements with Secretaries of Agriculture, Army, and the Interior to provide maximum utilization of programs to achieve and maintain water quality; transfer of funds; authorization of appropriations

(1) The Administrator shall enter into agreements with the Secretary of Agriculture, the Secretary of the Army, and the Secretary of the Interior, and the heads of such other departments, agencies, and instrumentalities of the United States as the Administrator determines, to provide for the maximum utilization of other Federal laws and programs for the purpose of achieving and maintaining water quality through appropriate implementation of plans approved under section 1288 of this title and nonpoint source pollution management programs approved under section 1329 of this title.

(2) The Administrator is authorized to transfer to the Secretary of Agriculture, the Secretary of the Army, and the Secretary of the Interior and the heads of such other departments, agencies, and instrumentalities of the United States as the Administrator determines, any funds appropriated under paragraph (3) of this subsection to supplement funds otherwise appropriated

to programs authorized pursuant to any agreement under paragraph (1).

(3) There is authorized to be appropriated to carry out the provisions of this subsection, $100,000,000 per fiscal year for the fiscal years 1979 through 1983 and such sums as may be necessary for fiscal years 1984 through 1990.

(l) Individual control strategies for toxic pollutants

(1) State list of navigable waters and development of strategies

Not later than 2 years after February 4, 1987, each State shall submit to the Administrator for review, approval, and implementation under this subsection—

(A) a list of those waters within the State which after the application of effluent limitations required under section 1311(b)(2) of this title cannot reasonably be anticipated to attain or maintain (i) water quality standards for such waters reviewed, revised, or adopted in accordance with section 1313(c)(2)(B) of this title, due to toxic pollutants, or (ii) that water quality which shall assure protection of public health, public water supplies, agricultural and industrial uses, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water;

(B) a list of all navigable waters in such State for which the State does not expect the applicable standard under section 1313 of this title will be achieved after the requirements of sections 1311(b),

1316, and 1317(b) of this title are met, due entirely or substantially to discharges from point sources of any toxic pollutants listed pursuant to section 1317(a) of this title;

(C) for each segment of the navigable waters included on such lists, a determination of the specific point sources discharging any such toxic pollutant which is believed to be preventing or impairing such water quality and the amount of each such toxic pollutant discharged by each such source; and

(D) for each such segment, an individual control strategy which the State determines will produce a reduction in the discharge of toxic pollutants from point sources identified by the State under this paragraph through the establishment of effluent limitations under section 1342 of this title and water quality standards under section 1313(c)(2)(B) of this title, which reduction is sufficient, in combination with existing controls on point and nonpoint sources of pollution, to achieve the applicable water quality standard as soon as possible, but not later than 3 years after the date of the establishment of such strategy.

(2) Approval or disapproval

Not later than 120 days after the last day of the 2-year period referred to in paragraph (1), the Administrator shall approve or disapprove the control strategies submitted under paragraph (1) by any State.

(3) Administrator's action

If a State fails to submit control strategies in accordance with paragraph (1) or the Administrator

does not approve the control strategies submitted by such State in accordance with paragraph (1), then, not later than 1 year after the last day of the period referred to in paragraph (2), the Administrator, in cooperation with such State and after notice and opportunity for public comment, shall implement the requirements of paragraph (1) in such State. In the implementation of such requirements, the Administrator shall, at a minimum, consider for listing under this subsection any navigable waters for which any person submits a petition to the Administrator for listing not later than 120 days after such last day.

(m) Schedule for review of Guidelines

(1) Publication

Within 12 months after February 4, 1987, and biennially thereafter, the Administrator shall publish in the Federal Register a plan which shall—

(A) establish a schedule for the annual review and revision of promulgated effluent guidelines, in accordance with subsection (b) of this section;

(B) identify categories of sources discharging toxic or nonconventional pollutants for which guidelines under subsection (b)(2) of this section and section 1316 of this title have not previously been published; and

(C) establish a schedule for promulgation of effluent guidelines for categories identified in subparagraph (B), under which promulgation of such guidelines shall be no later than 4 years after February 4, 1987, for

categories identified in the first published plan or 3 years after the publication of the plan for categories identified in later published plans.

(2) Public review

The Administrator shall provide for public review and comment on the plan prior to final publication.

33 U.S.C. § 1316

§ 1316. National standards of performance

(a) Definitions

For purposes of this section:

(1) The term "standard of performance" means a standard for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants.

(2) The term "new source" means any source, the construction of which is commenced after the publication of proposed regulations prescribing a standard of performance under this section which will be applicable to such source, if such standard is thereafter promulgated in accordance with this section.

(3) The term "source" means any building, structure, facility, or installation from which there is or may be the discharge of pollutants.

(4) The term "owner or operator" means any person who owns, leases, operates, controls, or supervises a source.

(5) The term "construction" means any placement, assembly, or installation of facilities or equipment (including contractual obligations to purchase such facilities or equipment) at the premises where such

equipment will be used, including preparation work at such premises.

(b) Categories of sources; Federal standards of performance for new sources

(1)(A) The Administrator shall, within ninety days after October 18, 1972, publish (and from time to time thereafter shall revise) a list of categories of sources, which shall, at the minimum, include:

pulp and paper mills;

paperboard, builders paper and board mills;

meat product and rendering processing;

dairy product processing;

grain mills;

canned and preserved fruits and vegetables processing;

canned and preserved seafood processing;

sugar processing;

textile mills;

cement manufacturing;

feedlots;

electroplating;

organic chemicals manufacturing;

inorganic chemicals manufacturing;

plastic and synthetic materials manufacturing;

soap and detergent manufacturing;

fertilizer manufacturing;

petroleum refining;

iron and steel manufacturing;

nonferrous metals manufacturing;

phosphate manufacturing;

steam electric powerplants;

ferroalloy manufacturing;

leather tanning and finishing;

glass and asbestos manufacturing;

rubber processing; and

timber products processing.

(B) As soon as practicable, but in no case more than one year, after a category of sources is included in a list under subparagraph (A) of this paragraph, the Administrator shall propose and publish regulations establishing Federal standards of performance for new

sources within such category. The Administrator shall afford interested persons an opportunity for written comment on such proposed regulations. After considering such comments, he shall promulgate, within one hundred and twenty days after publication of such proposed regulations, such standards with such adjustments as he deems appropriate. The Administrator shall, from time to time, as technology and alternatives change, revise such standards following the procedure required by this subsection for promulgation of such standards. Standards of performance, or revisions thereof, shall become effective upon promulgation. In establishing or revising Federal standards of performance for new sources under this section, the Administrator shall take into consideration the cost of achieving such effluent reduction, and any non-water quality, environmental impact and energy requirements.

(2) The Administrator may distinguish among classes, types, and sizes within categories of new sources for the purpose of establishing such standards and shall consider the type of process employed (including whether batch or continuous).

(3) The provisions of this section shall apply to any new source owned or operated by the United States.

(c) State enforcement of standards of performance

Each State may develop and submit to the Administrator a procedure under State law for applying and enforcing standards of performance for new sources located in such State. If the Administrator finds that the procedure and the law of

any State require the application and enforcement of standards of performance to at least the same extent as required by this section, such State is authorized to apply and enforce such standards of performance (except with respect to new sources owned or operated by the United States).

(d) Protection from more stringent standards

Notwithstanding any other provision of this chapter, any point source the construction of which is commenced after October 18, 1972, and which is so constructed as to meet all applicable standards of performance shall not be subject to any more stringent standard of performance during a ten-year period beginning on the date of completion of such construction or during the period of depreciation or amortization of such facility for the purposes of section 167 or 169 (or both) of Title 26, whichever period ends first.

(e) Illegality of operation of new sources in violation of applicable standards of performance

After the effective date of standards of performance promulgated under this section, it shall be unlawful for any owner or operator of any new source to operate such source in violation of any standard of performance applicable to such source.

Comment ID 316bEFR.010.027

Subject Matter Code	17.03.02
RFC: EPA rationale to not require closed-cycle	

Author Name Carl Michael Smith

Organization Dept of Energy

Wet Cooling Towers Should Not Be Required Except on a Case-by-Case Basis - Although EPA's proposed rule does not directly require any facilities to convert their cooling systems to wet cooling towers, some of the alternative options presented do require wet towers or their flow-based equivalents at some subset of facilities. DOE does not believe that the Phase II rule should require any particular class of facilities to convert to wet towers. We acknowledge that some existing, once-through cooled plants are causing AEI and will need to make some changes to their current operations. These changes could involve a combination of new intake technologies, or voluntary operational changes, and restoration measures. Some companies may elect to install wet cooling towers in order to minimize AEI. We believe that these cases will be infrequent, however.

In most cases, the costs to retrofit wet cooling towers will far exceed the costs to employ other remedies. We are pleased that EPA states on page 17155 that it did

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not select wet cooling towers as the best technology available for existing facilities because of the high costs of the retrofits and the potential for energy shortfalls related to concurrent retrofits at multiple plants. Even though we agree with EPA's decision, we feel that for several reasons the EPA projections of the costs and energy impacts of retrofit to wet towers have been underestimated. EPA presents their estimate of the cooling system conversion capital costs to be $53 per kW (moderate) to $62 per kW (high)—(Appendix C, Phase II Technical Development Document (TDD), page C-5). In comparison NETL has developed retrofit cost estimates through a draft study by its contractor, Parsons Infrastructure and Technology Group. That draft report (forthcoming), entitled "An Investigation of Site-Specific Factors for Retrofitting Recirculating Cooling Towers at Existing Power Plants," estimates wet cooling tower retrofit costs at four sites. The site-specific nature of wet cooling system retrofits at existing facilities is further underscored by the wide range of the cost estimates for the four sites in that draft study which are $66 per kW to $128 per kW. These estimates are on a similar basis as the EPA estimates.

Neither the EPA nor the NETL cost estimates take into account certain site specific factors such as plume abatement. DOE feels that the Agency should have made some assumptions in their cost estimates for a range of site-specific factors affecting the costs of retrofits at existing facilities. These factors include, but are not limited to, the necessity for plume abatement and/or drift control for facilities located in urban areas or in close proximity to highways or airports, and the location of existing underground

utilities that may have to be re-routed to accommodate the recirculating system's piping lay-out. For one of the sites in the NETL draft study, the capital cost of the cooling tower alone would double should the local permitting authority require the use of plume abatement. This was not included in the costs presented in the study. However if 1 out of 4 sites studied may have needed plume abatement, we believe EPA should have assumed that a certain number of facilities in their national cost estimate included site-specific retrofit costs such as plume abatement (see Comment 26).

EPA Response

No response is required for this comment as DOE is a Federal partner in the rulemaking.

Comment ID 316bEFR.010.057

Subject Matter Code	9.0
	Costs

Author Name Carl Michael Smith

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Compliance Cost Estimate - Section B1, Page B1-17. EPA identifies uncertainties and limitations to their compliance cost estimate. However, EPA does not identify uncertainty in their cost estimating procedure. For instance, what is the level of uncertainty in the capital cost estimate? This is the largest cost element provided in Table B 1-7, yet there is no mention of the level of accuracy for such an estimate. The reader is unclear whether this is based on conceptual, preliminary, or detailed engineering studies for all potentially affected facilities. The level of accuracy expected from EPA's cost estimation methodology should be discussed. Moreover, EPA's cost analysis for wet cooling tower retrofits neglects to make any allowance for site-specific requirements which may be mandated by State and local ordinances for plume cooling tower installation.

Through a web search on plume abated cooling towers, DOE was able to identify the following URL's describing either new facilities that will employ wet cooling tower technology, or existing facilities that are

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retrofitting with wet cooling towers. DOE offers the following websites for EPA's consideration:

AES Granite Ridge, Londonderry, NH: http://www.aesc.com/londonderry/aesl_qna.html

NIST nuclear plant: http:///www.ncnr.nist.gov/AnnualReport/FY2000/operations.pdf and http://www. frm2.tu-muenchen.de/igorr/igorr-n113/ig-nl13-11.html

FPL Sacramento Power LLC: http://www.energy.ca.gov/sitingcases/riolinda/documents/applicants_files/2001-08-22_PROP_REVISION.PDF

Blythe Energy LLC: http://www.energy.ca.gov/sitingcases/blythe/documents/2001-03-06_APPLICANTCOMMENT.PDF

Orion Power: http://www.orion.ene.com/files/executive_ summary/S11.pdf

Agnews Plant (Calpine) – San Jose, CA: http://www.santateresacitizen.org/plume.html

Calgary Energy Centre (Calpine): http://calgary energy. calpine.com/docs/Jan01_newsletter.pdf

Empire State Newsprint, Albany, NY: http://www.besicorp.com/empire/info.html

Metcalf Energy Center (Calpine), Santa Clara County, CA: http://www.metcalfenergycenter.com/execsummary. asp

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[Footer omitted in printing.]

New York Power Authority, Astoria Plant, Queens, NY, new 500 MW CC: http://www.nypa.gov/ccf/NYPA%20Article%20X/text/Section%202.0%20Public%20Involvement%20(final).pdf

Badger Generating Co. LLC, Kenosha County, WI , new 1050 MW CC: http://www.psc.state.wi.us/cases/badger/exec_sum.htm

Customer list – Plume Abatement Cooling Towers – Emcotek: http://www.emcotek.com/references.htm

Duke Energy Morrow Bay Power Plant, conversion of 1058 MW gas-fired steam plant from once-through saline water cooling to cooling towers (saline water): http://www.morro-bay.ca.us/rwqcbsup.pdf

FPL Energy Elverta Power Project, Rio Linda, CA: http://obri.net/stop/fplcpac.html

Athens Generating Company, Athens, Greene County, NY, 1080 MW CC: http://www.stoptheplant.org/parks_and_recreation_brief.htm

From this list, it appears as though plume abatement features are commonly employed in new and retrofit wet cooling towers thereby further supporting DOE's position.

As can be seen by visiting the URL's identified on the list, plume abatement is not required by EPA rules, but by local permitting regulations. These regulations generally require that "visual impacts" of any proposed new installation be minimized. This usually means eliminating any visible vapor plume from a cooling

tower. If there is an airport anywhere in the vicinity, the FAA will also have to evaluate any potential visibility or icing impacts from a cooling tower vapor plume.

After reviewing this information, it seems obvious that by neglecting plume abatement entirely in their cost analysis, EPA is considerably underestimating the cost of compliance with the proposed Phase II regulations for options 1 and 4, given that plume abatement approximately doubles the cost of the cooling tower (by EPA's own cost estimate).

Additional costs should also be included for materials that would appropriately handle brackish or saline water. As EPA has indicated in a fax sent to NETL (D. Nagle to E. Parsons, January 18, 2002), these additional costs should be valued at 25 percent of tower costs. DOE agrees that this is a reasonable factor for corrosion resistant materials and drift elimination technology.

EPA Response

No Response Necessary to DOE comment.

Comment ID 316bEFR.010.101

Subject Matter Code	9.0
Costs	

Author Name Carl Michael Smith

Organization Dept of Energy

Energy Penalty Analysis of Possible Cooling Water Intake Structure Requirements on Existing Coal-Fired Power Plants

US Department of Energy

Working Draft -- May 23, 2002

1.0 Executive Summary

Section 316(b) of the Clean Water Act requires that cooling water intake structures must reflect the best technology available for minimizing adverse environmental impact. Many existing power plants in the United States utilize once-through cooling systems to condense steam. Once-through systems withdraw large volumes (often hundreds of millions of gallons per day) of water from surface water bodies. As the water is withdrawn, fish and other aquatic organisms can be trapped against the screens or other parts of the intake structure (impingement) or if small enough, can pass through the intake structure and be transported

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through the cooling system to the condenser (entrainment). Both of these processes can injure or kill the organisms. EPA adopted 316(b) regulations for new facilities (Phase I) on December 18, 2001. Under the final rule, most new facilities could be expected to install recirculating cooling systems, primarily wet cooling towers. The EPA Administrator signed proposed 316(b) regulations for existing facilities (Phase II) on February 28, 2002. The lead option in this proposal would allow most existing facilities to achieve compliance without requiring them to convert once-through cooling systems to recirculating systems. However, one of the alternate options being proposed would require recirculating cooling in selected plants.

EPA is considering various options to determine best technology available. Among the options under consideration are wet-cooling towers and dry-cooling towers. Both types of towers are considered to be part of recirculating cooling systems, in which the cooling water is continuously recycled from the condenser, where it absorbs heat by cooling and condensing steam, to the tower, where it rejects heat to the atmosphere before returning to the condenser. Some water is lost to evaporation (wet tower only) and other water is removed from the recirculating system as a blow down stream to control the building up of suspended and dissolved solids. Makeup water is withdrawn, usually from surface water bodies, to replace the lost water. The volume of makeup water is many times smaller than the volume needed to operate a once-through system.

Although neither the final new facility rule nor the proposed existing facility rule require dry cooling

towers as the national best technology available, the environmental community and several States have supported the use of dry-cooling technology as the appropriate technology for addressing adverse environmental impacts. It is possible that the requirements included in the new facility rule and the ongoing push for dry cooling systems by some stakeholders may have a role in shaping the rule for existing facilities. The temperature of the cooling water entering the condenser affects the performance of the turbine—the cooler the temperature, the better the performance. This is because the cooling water temperature affects the level of vacuum at the discharge of the steam turbine. As cooling water temperatures decrease, a higher vacuum can be produced and additional energy can be extracted. On an annual average, oncethrough cooling water has a lower temperature than recirculated water from a cooling tower. By switching a once-through cooling system to a cooling tower, less energy can be generated by the power plant from the same amount of fuel. This reduction in energy output is known as the energy penalty. If a switch away from once-through cooling is broadly implemented through a final 316(b) rule or other regulatory initiatives, the energy penalty could result in adverse effects on energy supplies.

Therefore, in accordance with the recommendations of the Report of the National Energy Policy Development Group (better known as the May 2001 National Energy Policy), the U.S. Department of Energy (DOE), through its Office of Fossil Energy, National Energy Technology Laboratory (NETL), and Argonne National Laboratory (ANL), has studied the energy penalty resulting from converting plants with once-

through cooling to wet towers or indirect-dry towers. Five locations – Delaware River Basin (Philadelphia), Michigan/Great Lakes (Detroit), Ohio River Valley (Indianapolis), South (Atlanta), and Southwest (Yuma) – were modeled using an ASPEN simulator model. The model evaluated the performance and energy penalty for hypothetical 400-MW coal-fired plants that were retrofitted from using once-through cooling systems to wet- and dry-recirculating systems. The modeling was initially done to simulate the hottest time of the year using temperature input values that are exceeded only 1 percent of the time between June through September at each modeled location. These are the same temperature inputs commonly used by cooling tower designers to ensure that towers perform properly under most climatic conditions. The high temperature inputs correspond to the time of year when the highest power demands are observed and the needs for generating capacity are most critical due to the very high cost of buying replacement power on the spot market. Later, modeling was completed to estimate the monthly energy penalties, which were arithmetically averaged to generate an estimate of annual average energy penalty.

The results of the one-percent-high temperature modeling show that conversion to a wet tower could cause energy penalties ranging from 2.4 percent to 4.0 percent. This means that the plant will produce 2.4 percent to 4.0 percent less electricity with a wet tower than it did with a oncethrough system while burning the same amount of coal. That lost electricity could be made up at this plant or at some other existing or new plant by burning additional fuel. These peak-summer penalties are somewhat higher than those estimated by

EPA in the technical documentation published with its April 9, 2002 proposal for existing facilities. DOE believes that EPA did not include all the relevant costs and made some inappropriate assumptions; these are described at the end of Chapter 4. When more appropriate costs and assumptions are considered, EPA estimates compare favorably with those in this report.

Conversion to an indirect-dry tower, where possible, could cause energy penalties ranging from about 8.9 percent to 12.14 percent using 20 degrees F for the approach (the difference between the inlet air dry-bulb temperature and the desired cold water temperature), and 12.7 percent to almost 16 percent using an approach of 40 degrees F. The industry norm for indirect dry towers – a 40-degree approach—was evaluated initially, but the resulting pressures for the steam turbines were found to result in unacceptable operating conditions during the one-percent highest temperature times of the year. The mostly likely way that a company could operate a retrofitted indirect-dry tower at a 40-degree approach would be to reduce the power output from the plant (load shedding) during the hottest times of the year – just when the power demand is the greatest.

This power output reduction imparts an immediate energy penalty. On completion of the analysis it was determined that even if load shedding was attempted on all the 40-degree approach cases it would still be technically infeasible to operate the turbines safely during the summer months. To provide more information on dry tower energy penalties, a more

conservative approach of 20 degrees was subsequently modeled.

The results of the annual energy penalty modeling show that conversion to a wet tower could cause energy penalties ranging from 0.8 percent to 1.5 percent. Conversion to an indirect-dry tower could cause energy penalties ranging from about 4.2 percent to 5.2 percent using 20 degrees F for the approach, and 7.9 percent to almost 8.8 percent using an approach of 40 degrees F.

A review of the "Environmental Directory of US Powerplants" (EEI 1996) indicated that in 1996, there were 258,906 MW of electric generating capacity in the United States that consisted of steam electric power plants employing once-through cooling. The one percent highest temperature analysis modeled plants in just five locations and under very warm temperature conditions, but the modeled facilities are believed to be representative of the climatic conditions found throughout those portions of the country where once-through cooling is prevalent. It is quite possible that much of the Nation could experience very high temperatures at the same time (e.g., week of August 6, 2001), leading to results even more extreme than those calculated here. Tables ES-1 and ES-2 demonstrate the effects on electric generating capacity during the one-percent highest temperature conditions if 10, 25, 50, or 100 percent of the existing once-through cooled power plants in the United States were required to convert to either wet or indirect-dry cooling towers. The example of a requirement for 100 percent of the plants to retrofit to either wet or dry towers is hypothetical since it would be technically infeasible to

do either. The energy, time, and expense required to make up for these losses is significant and would not necessarily require building new plants. But for example in the "average" case, 19 additional 400-MW plants might have to be built to replace the generating capacity lost by replacing oncethrough cooling with wet cooling towers in 100 percent of existing steam plants. If some of those affected plants were required to retrofit an indirect-dry tower, the energy penalty impacts would be over three times higher. For example, the "average" case might require 66 new 400-MW plants to be built to replace the generating capacity lost by replacing once-through cooling with indirect dry cooling towers with a 20-degree air-side approach in 100 percent of existing steam plants. This example of new plants needed if 100 percent of existing plants were required to retrofit to dry towers is far too low since after thoroughly completing this analysis it has been determined that it would be impossible for most existing plants to be retrofitted to dry towers at many locations and therefore there would be a need for closures and far more new power plants than provided in the simple example above.

These new power plants may be needed to replace the energy lost as a result of the conversion from once-through to recirculating cooling, and do not reflect the need to build additional new generating capacity to meet the nation's growing demands for electricity. The U.S. Department of Energy's Annual Energy Outlook states that anticipated growth in electricity sales between 2000 and 2020 is about 1.8 percent per year (EIA 2001a). Alternatively, some of the existing plants that might have to retrofit to either wet or indirect-dry cooling systems may be able to just burn more fuel to

replace the electricity lost due to the cooling system conversion. Either way, additional fuel will be burned and other adverse environmental impacts will be created such as increased emissions, land use, and noise pollution.

To more closely evaluate the impact of increased air emissions from burning additional fuel, several additional analyses were performed. Estimates of incremental air emissions were made using the average annual energy penalty results at the Delaware River Basin site and the South site. The results show that when once-through cooled plants are converted to wet cooling towers, the incremental air emissions are not large on a percentage basis (generally less than one percent), but the absolute increases in pounds or tons of key air pollutants (SO2, NOx, PM, mercury, and CO2) are large nonetheless. If once-through cooled plants are converted to indirect-dry towers, however, the incremental air emissions can be significant. For dry towers with a 20-degree approach, the percentage increase in air emissions can exceed 4 percent depending on how the power company makes up the lost energy. For dry towers with a 40-degree approach, the percentage increase in air emissions can approach 8 percent and the number of additional pounds or tons is quite large.

Incremental air emissions are of greatest concern in nonattainment areas. Nonattainment areas are identified for "criteria pollutants" established under the 1970 Amendments to the Clean Air Act that do not meet standards set by EPA. The term "criteria pollutants" derives from the requirement that EPA must describe the characteristics and potential health

and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised. Although a national impact analysis is not performed in the present study, a general conclusion is that incremental air emissions are counterproductive to achieving standards set by EPA for air quality. There are a number of nonattainment locations throughout the United States where incremental air emissions could occur from an energy penalty associated with a requirement to add a cooling tower to existing power plants.

One important finding of this report is that neither indirect-dry nor direct-dry towers are viable as a retrofit technology at most U.S. locations under the one-percent-highest temperature conditions. As previously noted, many of the model runs evaluating conversion to indirect-dry towers resulted in calculated turbine pressures that exceeded the upper limit for safe turbine operation. This was true of all of the model runs made using the 40-degree approach assumption and for one quarter of the runs made at 20 degrees. The point should be made that the practice of load shedding, a method of reducing the steam load through the turbine, thereby reducing the condenser heat duty by a proportional amount, would not effectively lower the turbine backpressure enough for safe operation under the runs modeled with a 40-degree approach assumption. Even for those 20-degree approach cases in which the turbine pressures were below the upper safe limit, an indirect-dry tower would occupy huge amounts of space, which may not be available in an existing plant originally built with once through cooling. The results of sizing calculations to determine the required footprint area for a

representative case of retrofitting to indirect dry towers at a 20-degree approach are discussed in section 10.2. Direct-dry towers are not practical either. In an existing plant, there simply is no room for the large-diameter ductwork required to conduct -atmospheric steam from the turbine exhaust hood to a direct-dry cooling tower.

Dry towers have been used as part of newly constructed cooling systems. If the entire power generating system (boiler, turbine, condenser, and cooling) is designed with dry cooling in mind, dry cooling does have applications. For retrofitted dry towers, the issues of large footprint and high energy penalty are important.

Table ES-1 - Wet Cooling Tower Energy Penalties and Impact at One Percent Highest Temperature Conditions

[see hard copy for table]

Table ES-2 - Indirect-Dry Cooling Tower Energy Penalties and Impact at One Percent Highest Temperature Conditions

[see hard copy for table]

2.0 Glossary

[see hard copy]

3.0 Introduction

3.1 Legal Background for Cooling Water Intake Structure Requirements

Section 316(b) of the Clean Water Act, enacted by Congress in 1972, addresses withdrawal of cooling water from surface water bodies, as follows:

Any standard established pursuant to section 301 or section 306 of this Act and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact.

In 1976, the U.S. Environmental Protection Agency (EPA) promulgated final §316(b) regulations (April 26, 1976; 41 FR 17387). However, those regulations were successfully challenged by a group of 58 utilities [Appalachian Power Co. v. Train, 10 ERC 1965 (4th Cir. 1977)]. In 1979, EPA formally withdrew its §316(b) regulations (June 1979; 44 FR 32956). As a consequence of the vacuum created by the absence of Federal regulations, many States adopted their own cooling water intake regulations to implement the §316(b) requirements. The broad statutory language facilitated widely differing interpretations by the States. Some adopted comprehensive programs, others imposed less rigorous requirements, and still others never developed formal regulations.

In the mid-1990s, a coalition of environmental groups, headed by the Hudson Riverkeeper, filed suit against EPA over failure to repromulgate §316(b) regulations

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[Footer omitted in printing.]

[Cronin, et al. v. Reilly, 93 Civ. 0314 (AGS)]. On October 10, 1995, the U.S. District Court, Southern District of New York, entered a Consent Decree between the parties, directing EPA to regulate cooling water intake structures within 7 years. Under the Consent Decree, EPA agreed to propose regulations by June 1999 and promulgate a final rule by 2001. The Consent Decree was modified on November 21, 2000 to: a) finalize new facility regulations by November 9, 2001; b) propose existing source large utility and non-utility power producer regulations by February 28, 2002 and issue final regulations by August 28, 2003; and c) propose regulations by June 15, 2003 and issue final regulations by December 15, 2004 for other existing facilities not covered in b) above.

3.2 Purpose of This Report

EPA adopted 316(b) regulations for new facilities on December 18, 2001 (66 FR 65256). Under the final rule, most new facilities could be expected to install recirculating cooling systems, primarily wet cooling towers. The EPA Adminstrator signed proposed 316(b) regulations for existing facilities on February 28, 2002. The lead option in this proposal would allow most existing facilities to achieve compliance without needing to convert once-through cooling systems to recirculating systems. However, one of the alternative options proposed requires recirculating cooling in selected plants.

Until this rule is finalized, retrofitting to recirculating cooling remains a regulatory option.

[Footer omitted in printing.]

Although neither the final new facility rule nor the proposed existing facility rule require dry cooling towers as the national best technology available, the environmental community and several States have supported the use of dry-cooling technology as the appropriate technology for addressing adverse environmental impacts. It is possible that the requirements included in the new facility rule and the ongoing push for dry cooling systems by some stakeholders may have a role in shaping the rule for existing facilities. Recognizing that over 50 percent of the existing coal-fired power plants employ once-through cooling systems, a decision to require many or all of these plants to install dry- or wet-cooling tower systems could have impacts on electricity costs and availability as well as secondary environmental impacts.

The purpose of this report is to quantify the loss of net electric output from an existing coal-fired power plant that would result from the replacement of its once-through cooling system to either a wet- or a dry-cooling tower. The reduction in net electric output is known as the energy penalty and is discussed below. Modeling was done for five locations to simulate the hottest time of the year using temperature values that are exceeded only 1 percent of the time between June through September at each modeled location. This corresponds to the time of year when the highest power demands are observed. To give an idea of the energy penalty at times other than the hottest period of the year, additional modeling was conducted on a monthly basis. This technique allowed for the calculation of an annual average energy penalty value at each site.

[Footer omitted in printing.]

In order to compensate for the electricity lost as a result of the energy penalty, utilities would need to produce more electricity through burning additional fuel, thereby generating additional air emissions. A second purpose of this report is to quantify the additional amount of air emissions that would result at existing coal-fired plants using wet or dry cooling systems. Estimates of incremental air emissions were made at the Delaware River Basin and the South sites.

4.0 Overview of Cooling Systems at Steam Electric Power Plants

4.1 Cooling Water Use

Water is used in many industrial applications to cool machinery or to condense steam. The largest industrial user of cooling water is the steam electric power industry. Data from a recent U.S. Geological Survey (USGS) report indicate that steam electric power generation uses approximately 190 billion gallons of water per day (USGS 1998). In 1999, more than 60 percent of the utility power generating capacity in the United States (382,270 MW) utilized the steam-electric process (EIA 2000). At nuclear and fossil-fuel power plants, electricity is produced by heating purified water to create high-pressure steam. The steam is expanded in turbines, which drive the generators that produce electricity. After leaving the turbines, the steam passes through a condenser that has multiple tubes and a large surface area. A large volume of cool water circulates through the tubes, absorbing heat from the steam. As the steam cools and condenses, the temperature of the cooling water rises.

4.2 Types of Cooling Systems at Steam Electric Power Plants

Most power plants use either once-through cooling or recirculating cooling. Once-through cooling systems withdraw large volumes of water — typically in the range of tens of millions to billions of gallons per day from a river, lake, estuary, or ocean. The water is pumped through the condenser and finally returned to the same or a nearby water body. Recirculating cooling systems receive their cooling water from and return it to a cooling tower and basin, cooling pond, or cooling lake. Because evaporation and planned cooling tower blowdown (periodic discharges of portions of the recirculating water to remove build up of solids and other undesirable constituents) removes cooling water from the evaporative system, regular additions of "makeup" cooling water are needed. Makeup volumes are much lower than daily once-through volumes, and may range from hundreds of thousands to millions of gallons per day. The USGS estimates that about 2 percent of the water withdrawn for steam electric power generation was consumed as a result of once-through cooling, cooling towers, or pond cooling (USGS 1998).

This report considers two types of recirculating cooling systems – wet towers and indirect-dry towers. These are defined in Section 2 and described in Section 5.3.

4.3 How Cooling Water Affects Steam Power Plant Performance

High-pressure steam is generated in a boiler whose heat source is a high temperature atmospheric

pressure furnace fired by some type of fossil fuel or a nuclear reactor. The high-pressure steam is expanded through a multistage turbine that turns a generator to produce electricity. Spent exhaust steam exiting the turbine is condensed and recycled to the boiler for steam production. During the condensation process, a large quantity of low-grade heat is absorbed by the condenser coolant, which is typically water.

The steam side of the condenser operates under vacuum conditions (i.e., a pressure below normal atmospheric pressure). The magnitude of the condenser vacuum depends chiefly upon the condenser design and the incoming temperature of the condenser coolant. Lower coolant temperatures will produce a larger vacuum in the condenser that, to a certain extent, has a favorable effect on performance. Likewise, higher condenser coolant temperatures are associated with a smaller vacuum, resulting in reduced energy output. These relationships are based on the laws of thermodynamics and hold true regardless of the type of cooling system used (once-through or recirculating).

4.4 The Energy Penalty

Steam condensers are designed to produce a vacuum at the outlet end of the turbine, thereby increasing the efficiency of the system. The temperature of the cooling water exiting the condenser affects the performance of the turbine — the cooler the temperature, the better the performance. As cooling water temperatures decrease, a higher level of vacuum can be produced and additional energy can be extracted. On an annual average, once-through cooling

water has a lower temperature than recirculated water from a cooling tower. Because most of the heat rejection in a wet cooling tower is due to evaporation, the temperature of the recirculated cooling water is limited by the ambient air wet- bulb temperature. It can never be lower than the wet-bulb temperature and generally is about 5 to 10 F higher. As a result of switching from a once-through cooling system to a cooling tower, less energy can be generated by the power plant from the same amount of fuel.

In a related manner, the performance of a dry cooling system is limited by the ambient air dry-bulb temperature because all of the heat rejection in a dry cooling system is attributable to sensible heating of the surrounding air. Since dry-bulb temperatures are higher than corresponding wet-bulb temperatures, the performance of dry cooling systems will be less than wet systems (either once-through or recirculating). In fact, a recent analysis of cooling system options for combined-cycle power plants found that at nearly all locations and under nearly all climatic conditions in the United States, the performance of a properly designed and operated recirculating cooling system would be superior to a comparable direct-dry cooling system (Burns and Micheletti 2000).2001). Therefore, switching a once-through cooling system to a dry cooling system would mean that the decline in power generation for a given amount of fuel would be even greater than for a once-through to a recirculating wet cooling system retrofit.

Veil et al. (1992) summarized literature values for the energy penalty associated with retrofitting once-through cooled plants with wet-cooling towers. The

majority of the data points for the energy penalty for fossil-fueled plants were clustered in a band between 1.5 percent to 2.5 percent. Results for nuclear power plants show greater variability, ranging between 1 percent and 5.8 percent. The data points were not as clearly clustered in a narrow range as were the data points for the fossil plants. Veil et al. (1992) selected a range of 2 percent to 3 percent for the decrease in net electrical power that could be experienced if existing nuclear power plants retrofit from once-through to wet cooling.

In a more recent study, Burns and Micheletti (2000) estimate the maximum energy penalty values for a new generic 750-MW combined-cycle power plant using either a wet recirculating cooling system or a direct dry cooling system at sites in five different parts of the country. In this study, the energy penalty is defined as the loss of electricity generating capacity incurred when a cooling system is unable to perform at design efficiency. Then for both types of cooling systems, the maximum energy penalty occurs during the hottest times of the year when ambient wet-bulb and dry-bulb temperatures are greatest. This period normally is represented by 1 percent of the time during the four warmest months, which also happen to coincide with the times of national peak electricity demand. For recirculated wet cooling, the estimated maximum energy penalty was less than 1 percent for any of the five sites. For direct dry cooling, the estimated maximum penalty ranged from 11.6 percent to 18.1 percent, depending on site climatic conditions. Although the estimates prepared by Burns and Micheletti indicate a dramatic difference in the maximum energy penalties expected from using wet

and dry cooling systems, the results are not directly comparable to this study for two reasons. First, the Burns and Micheletti estimates were based exclusively on new cooling systems for new plants and did not consider any of the retrofit complexities associated with an existing once-through cooling system at an existing plant. Second, the Burns and Micheletti estimates were based on a direct-dry cooling system, while an indirect dry cooling system would be a more suitable retrofit option for an existing once-through cooling system (see subsequent discussion in Section 5.3).

For its 316(b) regulation development, EPA researched and derived energy penalty estimates based on empirical data and proven theoretical concepts for a variety of conditions (EPA 2002). To estimate nationally representative energy penalties, EPA sought data to estimate representative regions. These four regions include Northeast (Boston, MA), Southeast (Jacksonville, FL), Midwest (Chicago, IL) and Northwest (Seattle, WA). The Agency calculated the turbine component of the energy penalty by examining the empirical effect on net plant heat rates resulting from changing turbine exhaust pressures for fossil-fueled, combined-cycle, and nuclear plants. The Agency related the turbine exhaust pressure to ambient conditions for the selected locations. Because the source water temperature for once-through cooling systems and the ambient wet bulb and dry bulb temperatures for cooling towers varies with location and time of year the Agency used empirical coastal water temperatures at the four selected locations.

For calculation of monthly average wet and dry bulb temperatures, EPA calculated time-weighted averages during the daytime period between 8 AM and 4 PM. Since the energy penalty will vary over time as ambient climatic and source water temperatures vary, the calculation of the total annual energy penalty for a chosen location integrated the results of individual calculations performed on a periodic, monthly basis. EPA used design temperatures to calculate peak-summer penalties for the selected locations based on the temperature that ambient conditions equaled or exceeded one percent of the time.

EPA derived the turbine exhaust pressure values for alternative cooling system scenarios in conjunction with the empirical temperature values. EPA used these turbine exhaust pressure values to estimate the associated change in turbine efficiency. EPA then calculated either the peak-summer (design) or the monthly energy penalty. Annual values were calculated by averaging the 12 monthly values. The annual average energy penalty values for fossil-fueled plants at the four regional sites ranged from 1.5 to 1.8 percent and the peak-summer energy penalties ranged from 1.4 to 2.0 percent.

It should be noted that EPA's annual average energy penalties were based on assuming that plants operate at just 67 percent of maximum load. The DOE does not agree with this assumption for base load plants and has brought this to EPA's attention. Subsequently, EPA estimated a 1.1% annual energy penalty based on assuming that plants operated at 100 percent of the maximum load.

[Footer omitted in printing.]

The annual average penalties presented in Chapter 8 of this report are similar to those calculated by EPA, but the EPA estimates of peak summer energy penalties are considerably lower than those presented in Chapter 7 of this report. The reasons for this discrepancy are:

- EPA does not include all the pumping costs associated with a wet tower retrofit. The additional pumping costs could add approximately 0.2 to 0.7 percent to EPA's energy penalty estimates.

- EPA uses a range assumption at or near 20 degrees, which is higher than that used in most of the DOE model runs. Those runs were based on actual temperature data provided by EPA for each of the model locations (see descriptions in Chapter 7). If a 15-degree range were used, the energy penalty would increase by about 0.5 percent.

- EPA's analysis assumes that the condenser duty is the same when converting from once-through cooling to wet cooling towers. DOE estimates that this could result in a maximum additional penalty of 0.5 percent.

Adding the contributions from these three items yield a possible increase in the EPA peak energy penalty of 1.0 to 1.5 percent and a revised EPA peak energy penalty of 2.7 to 3.2 percent for conversion to wet towers. These revisions to the EPA analysis to adjust

to similar basis with this study shows approximate agreement to the DOE results.

[comment continued in 316bEFR.0 10. 102]

EPA Response

No response is required for this comment as DOE is a Federal partner in the rulemaking.

Comment ID 316bEFR.029.032

Subject Matter Code	9.0
Costs	

Author Name Elise N. Zoli

Organization Godwin Proctor Counselors at Law obo Entergy Corporation

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EPA also fails to include the significant energy penalty due to the shutdown of units during installation. The impact is particularly significant and in some cases compromising of the local electric system's reliability, if facilities shut down permanently because conversion is not economically feasible. EPA also fails to account for turbine back-pressure, which EPA concedes could significantly affect net facility capacity, see Phase II TDD Ch. 5.3, by assuming that turbine backpressure for a retrofitted facility would be the same as for a new facility with cooling towers. Impacts to system reliability and energy pricing is expected to be severe, as discussed below. Certainly, EPA's conclusion that impacts are nominal is patently erroneous, as applied to Entergy stations. See National Economic Research Associates ("NERA"), Electricity System Impacts of Nuclear Shutdown Alternatives, dated March 2002 (Appendix 6). Department of Energy (DOE), and others, concur. See Phase II TDD at 5-31 to 5-34.

By way of example, in the important peak summer period, Vermont Yankee Nuclear Power Facility sacrifices 9 megawatts to operate the cooling towers and an additional 20 megawatts due to increased condenser back pressure as a result of higher condensate temperatures. These megawatts represent 5.3% of Vermont Yankee Nuclear Station's available power. Further, this power generation represents the major source (i.e., 78%) of electric power in Vermont, with the result that impacts of any reduction would be severe for Vermont's electricity consumers.

EPA Response

EPA has considered the energy penalty issue raised by the commenter and it was one of the factors influencing EPA's decision to not base the requirements of the final rule on this technology.

Comment ID 316bEFR.060.022

Subject Matter Code	2.04.06
Restoration measures in place of technologies	

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Organization PG & E National Energy Group

In addition, only voluntary use of mitigation measures is consistent with the language of Section 316(b). PG&E NEG does not agree with EPA's position that mitigation measures can be required by EPA under 316(b) as an aspect of the "design" of a cooling water intake structure. To construe the creation of an artificial reef or operation of a restocking program as an aspect of intake structure "design," as EPA proposes, see 67 FR 17,169 col. 1, defies any reasonable interpretation of the word. Nor is it consistent with the historical use of the term by EPA prior to this rulemaking. <FN 6> To the contrary, when EPA issued its first regulation implementing Section 316(b), it relied on a far more logical interpretation: defining "design" as "the arrangement of elements that make up the cooling water intake structure." 41 FR 17,387, 17,390 (1976).

EPA is not allowed to use statutory construction to claim an authority Congress has not chosen to assign it. See, e.g., Lopez-Flores v. Resolution Trust Corp., 93 F.

[Footer omitted in printing.]

Supp. 2d 834, 846 n. 34 (E.D. Mich. 2000) (noting that agency interpretations, even where entitled to deference, may not permissibly "expand the scope of an agency's authority into the external universe of topics that Congress neglected or purposefully omitted"). Here, the plain language of Section 316(b), supported by the contemporaneous evidence of the 1976 regulation, compels the conclusion that Congress did not assign EPA the authority to directly regulate mitigation measures as aspects of cooling water intake structure "design." EPA's original interpretation—that "design" of a cooling water intake structure does not include restoration of reefs—was correct.

However, PG&E NEG believes that Section 316(b) does authorize EPA to approve and to incorporate into an NPDES permit those mitigation measures voluntarily proposed by a facility, either in lieu of, or in combination with, technology. <FN 7> As discussed further in Section III.B.3.c.(i) below, the statutory language of Section 316(b) requires a threshold showing of adverse impact before EPA may impose technology-based requirements. To the extent that a facility proposes to implement mitigation measures to offset its environmental effects, this may reduce or eliminate altogether the "adverse impact" that forms the basis for imposing new technology. <FN 8> This interpretation of EPA's authority under Section 316(b) is consistent with that EPA and other federal authorities have adopted in implementing other, similar statutory provisions.

For example, EPA considers the effect of mitigation measures in determining under Section 404(c) of the CWA whether a project approved by the Corps of

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Engineers has an "unacceptably adverse effect" and thus must be vetoed by EPA. See, e.g., James City County, Va. v. EPA, 12 F.3d 1330, 1336-37 (4th Cir. 1993) (upholding EPA decision under Section 404(c) which considered mitigation measures offered by proponents of dam/reservoir project in determining whether a veto was appropriate). Courts have also affirmed that the Corps of Engineers may consider mitigation measures in determining whether a project "significantly affect[s] the quality of the human environment" and therefore triggers the Environmental Impact Statement ("EIS") requirement of NEPA. See Payette v. Horseshoe Bend Hydroelectric Co., 988 F.2d 989, 991 (9th Cir. 1993) (specifically noting that the Corps "can consider the effect of mitigation measures in determining whether preparation of an EIS is required"). These examples and others <FN 9> affirm that EPA can appropriately consider voluntarily proposed mitigation measures as offsets against requirements that would otherwise apply based on a facility's adverse environmental impact.

Because PG&E NEG believes that only voluntary use of mitigation measures is desirable policy or legally permissible as an interpretation of Section 316(b), PG&E NEG strongly endorses the voluntary approach set forth in EPA's preferred option. It opposes the alternative approaches that would make mitigation measures necessary in all or certain classes of cases, or would allow EPA (or a delegated state) to demand under 316(b) mitigation measures not identified voluntarily by the facility. See 67 FR 17,169 col. 3 - 17,170 col. 1.

[Footer omitted in printing.]

Footnotes

6 PG&E NEG recognizes that EPA relied on the definition of "design" proposed here in its final rule implementing Section 316(b) for new sources. See 66 FR 65,256, 65,314-15 (2001). PG&E NEG is not aware that any court has yet reviewed the new source rule and, for the same reasons outlined above, does not believe that EPA's interpretation in that context will be upheld.

7 This situation is analogous to an air emission source's accepting permit limitations to qualify as a "synthetic minor" source.

8 This argument is developed in detail in Anderson & Gotting, 26 Column. J. Evntl. L at 47-53. As Anderson and Gotting note, EPA's earliest documents relating to 316(b), including the 1973 Proposed Rule and the 1973 Development Document, specified that it was the "net" effect of a facility that determined whether there was an adverse impact and whether further technology was necessary to "minimize" it. Id at 47 & n.268.

9 Other cases involving consideration of mitigation measures under the CWA and NEPA are discussed in Anderson & Gotting, at 50-52. Anderson & Gotting also identify cases considering mitigation measures in determining whether a violation of the Endangered Species Act has occurred, id at 52-53.

EPA Response

Permittees must meet the requirements of today's rule through the use of design and construction technologies, operational measures or restoration

measures. Although compliance with today's rule is not voluntary, permittees may choose which design and construction technologies, operational measures, and/or restoration measures to present in their application to the permitting authority, subject to the requirements of the final rule. Restoration measures are not required at all sites by the final rule. In some cases, the choice of design and construction technologies and/or operational measures suitable for implementation at a site will be limited, and restoration measures will sometimes be the only feasible alternative. The technologies and/or measures ultimately implemented to meet the requirements of today's rule are subject to the approval of the permitting authority. A permittee may also request determination by the permitting authority of a site-specific performance standard as described at 125.94(a)(5).

For a discussion of EPA's authority to require restoration under the final rule, see the preamble to the final rule.

For additional information on EPA's interpretation of restoration measures as an aspect of cooling water intake structure design, see the preamble to the final rule.

For a discussion of adverse environmental impact threshold requirements, see EPA's response to comment 316bEFR.029.015.

[Footer omitted in printing.]

Comment ID 316bEFR.075.057

Subject Matter Code	9.04
Cooling system costs (e.g., dry, wet, recirculating)	

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Organization PSEG Services Corporation, Ofc of Environmental Counsel

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USEPA Substantially Underestimated the Costs of Retrofitting to Closed Cycle Cooling.

USEPA cannot justify any of the closed cycle cooling alternatives based on the data and information contained in the Docket. Even though, as shown below, the costs USEPA estimated are substantially lower than estimates based upon site-specific engineering estimates for existing facilities or extrapolations based on such analyses. USEPA, in the Preamble, rightly states that it did not select a nation-wide, closed-cycle requirement (i.e., the first closed-cycle option) "because of the generally high costs of such conversions... and serious concerns about the short term energy implications of a massive concurrent conversion and the potential for supply disruptions that it would entail." <FN 59> This was the right conclusion and PSEG believes it is equally applicable to the second and third closed-cycle options as well.

PSEG endorses USEPA's conclusion that the costs of retrofitting are too high, especially since USEPA substantially underestimated the costs for retrofitting existing facilities to operate with closed cycle cooling. USEPA provides the costs it relied upon to reach this conclusion in the EBA. <FN 60> USEPA estimated the total annualized cost for retrofitting all 426 power plants to be approximately 2.32 billion dollars or on average, approximately 5.45 million dollars per facility (annualized total cost). In connection with Section 316 (b) Demonstrations <FN 61> filed with the New Jersey Department of Environmental Protection ("NJDEP") between 1998 and 2001, PSEG commissioned preliminary engineering analyses and cost estimates for retrofitting three of its power plants located on estuaries or tidal rivers to operate with closed cycle cooling. These analyses were conducted for power plants that would have been within the scope of any of USEPA's three closed-cycle cooling options, and given the mix of fuel types and sizes of these plants, the cost estimates for these plants are likely to bound estimates that would be representative for a considerable range of facilities that would be affected by these options. As discussed below, Shaw Stone & Webster's report for UWAG <FN 62> corroborates PSEG's capital cost estimates for these facilities and echoes the conclusion that USEPA substantially underestimated the costs of retrofitting existing facilities for closed cycle cooling systems.

a. Mercer Generating Station

PSEG's Mercer Generating Station ("Mercer") consists of two coal-fired units withdrawing up to 345.6 MGD of once-through cooling water from the tidal river portion of the Delaware Estuary near Trenton, NJ. <FN 63>

[Footer omitted in printing.]

The present value capital cost to retrofit Mercer with wet mechanical draft cooling towers was estimated to be 55.74 million dollars. <FN 64> The total capital cost estimate presented in the Mercer C/B Analysis includes the following cost components: capital, labor and materials associated with construction and installation (Table 8-1). The PSEG total cost estimate of 55.74 million is very close to the 58.53 million estimated for Mercer Units 1 and 2 combined by Shaw Stone and Webster, Inc. <FN 65>

b. Hudson Generating Station

PSEG's Hudson Generating Station ("Hudson") consists of Units 1 and 2 that are natural gas and coal or natural gas fired units respectively. Unit 1 withdraws 388.8 mgd and Unit 2 withdraws 504.0 mgd of once-through cooling water from the estuarine reach of the Hackensack River. The total present value cost to retrofit Hudson with wet mechanical draft cooling towers was estimated to be 104.57 million dollars. <FN 66> The total capital cost estimate presented in the Hudson C/B Analysis includes the following cost components: capital, labor and materials associated with construction and installation (Table 8-1). The PSEG total cost estimate of 104.57 million dollars is the close to the 117.48 million dollars estimated for Hudson Units 1 and 2 combined in Shaw Stone and Webster Report.

c. Salem Generating Station

PSEG's Salem Generating Station ("Salem"), a base-load nuclear facility, consists of two units <FN 67> with a combined intake flow of up to 3,024 MGD of once-through cooling water from the Delaware Estuary. <FN 68> The total present value capital cost

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[Footer omitted in printing.]

estimate to retrofit Salem with wet mechanical draft cooling towers was 576.0 million dollars. <FN 69> The total capital cost estimate presented in Appendix F to Salem's 1999 Application is comprised of the following cost components: capital, labor and materials associated with construction and installation, (Appendix F IX Table 1). The PSEG total cost estimate of 576.0 million is close to the 593.32 million estimated for Salem Units 1 and 2 combined in Shaw Stone & Webster Report.

The total present value capital cost estimates for Mercer, Hudson and Salem were adjusted to total annualized capital costs so direct comparisons could be made to USEPA's facility cost estimate. The total annualized costs for retrofitting Mercer, Hudson, and Salem are estimated at $6.31, 8.69, and 51.07 million, respectively. <FN 70> The PSEG estimates for Mercer, Hudson, and Salem are substantially higher than USEPA's average total annualized cost estimate for an individual facility (i.e., 5.45 million in dollars). The PSEG estimates and the Shaw Stone & Webster estimates are based on preliminary engineering analyses conducted for existing facilities. USEPA, on the other hand, developed its estimates by extrapolating from its estimate of the costs associated with installing cooling towers at a new facility. It clearly stands to reason that the PSEG and UWAG estimates of substantially greater costs are more reliable. Also, the differences between the PSEG and Shaw Stone & Webster's estimate as compared to USEPA estimates indicate that consideration of site-specific factors are extremely important in providing realistic cost estimates for retrofitting existing facilities with mechanical draft cooling towers.

[Footer omitted in printing.]

In short, USEPA has substantially underestimated the costs that would be borne by society if a closed-cycle cooling alternative were adopted. Even using these substantial under-estimates, the Agency rightfully determined that the costs would outweigh any benefits that might result. Even the inclusion of provisions, whereby permittees could have (1) implemented restoration measures in lieu of retrofitting upon a demonstration of comparable performance or (2) petitioned for less stringent requirements if certain tests could be met <FN 71> would be insufficient to overcome the fundamental flaw caused by the substantial underestimation of costs.

Footnotes

59 67 Fed. Reg. 17122, 17155, col. 1 and 2.

60 EBA, p. B7-9.

61 Public Service Electric and Gas Company (PSEG). Hudson Generating Station Supplemental 316(b) Report, Chapter 8, "Costs and Benefits of Alternatives for Modifying Cooling Water Intakes", November 1998 ("Hudson C/B Analyis"); Public Service Electric and Gas Company (PSEG). Renewal Application Salem Generating Station NJPDES Permit No. NJ0005622. Appendix F: Clean Water Act Section 316(b) Demonstration, Section IX, "Costs and Benefits of Fish Protection Alternatives", Volume 14 of 36, March 4, 1999; PSEG Fossil LLC (PSEG) ("Appendix F to Salem's 1999 Application"); Mercer Generating Station 316(b) Demonstration. Chapter 8, "Costs and Benefits", November 2001 ("Mercer C/B Analysis").

62 Shaw Stone & Webster, Inc., Engineering Cost

Estimate for Retrofitting Closed-Cycle Cooling Systems at Existing Facilities, Appendix 15 to UWAG Phase II comments Prepared for the Utility Water Act Group ("Shaw Stone & Webster Report") (2002).

63 Mercer C/B Analysis, supra.

64 All Mercer cost estimates are present values as of January 1, 2002, in millions of 2000 dollars.

65 UWAG's Phase II Comments, Appendix 15, Cost of Retrofitting Cooling Towners at Existing U.S. Power Plants ("UWAG – Appendix 15").

66 All Hudson cost estimates are present values as of January 1, 2000, in millions of 1997 dollars.

67 Appendix F to Salem's 1999 Application.

68 PSEG had also commissioned Stone & Webster Engineering Corporation ("SWEC") to perform a preliminary engineering analysis and cost estimate for retrofitting Salem in 1990, which were updated in 1993 and again in 1999. In 1993, at the request of the NJDEP, PSEG hired a second firm, Sargent & Lundy ("S&L") to conduct a validation and verification of SWEC's work product. S&L confirmed that SWEC's design approach and cost estimates were reasonable and appropriate. S&L concluded that SWEC's engineering analysis and their cost estimates associated with the closed-cycle cooling retrofit were reasonable and consistent with sound engineering practice (Appendix F to Salem's 1999 Application, Section VIII). In 1999, SWEC reconfirmed the conclusions reached in 1990 and 1993 that retrofitting

Salem with a closed-cycle cooling system would require an unprecedented and complex construction effort (Appendix F to Salem's 1999 Application, Attachment 7).

69 All Salem cost estimates are present values as of January 1, 2001, in millions of 1998 dollars.

70 The Mercer estimate assumed a 7% discount rate with construction starting in 2002 and costs extending through 2015; the Hudson estimate assumed a 5.78% discount rate with construction starting in 2000 and costs extending through 2022; and the Salem estimate assumed a 6.19% discount rate with construction starting in 2001 and costs extending through 2021(All values are 2001 dollars).

71 See, 67 Fed. Reg. 17154 col. 1 and 2, Section VI.B.

EPA Response

See response to comment 316b.EFR.208.002.

Comment ID 316bEFR.099.013

Subject Matter Code	11.0
Role of Restoration	

Author Name R. McLean

Organization State of Maryland Dept of Natural Resources

How to measure "substantially similar performance" of restoration measures; methods to reduce uncertainty of restoration activities; margins of safety for restoration measures, basis for safety margins, appropriate authority to establish; how to consider additional environmental benefits to fish and shellfish in restoration projects; role of restoration in addressing CWIS impacts and alternative approaches (VI..A.5: 17147, 17148)

We believe that mitigation can play a valuable role in resolution of 316(b) issues on a site-specific basis. We use the term mitigation here to refer to something aside from alternative intake technologies or operating strategies which might be used to minimize impacts of cooling water intakes. The mitigation we refer to takes the form of some alternative measure which can compensate for resource losses in some other way.

Empirical studies of entrainment at Chalk Point (formerly owned by Potomac Electric Power Company or PEPCo, now Mirant) indicated the potential for significant losses of forage species (bay anchovy, naked

goby, silversides) in the Patuxent River estuary. Such losses can inhibit the successful completion of the life cycles of other important species that use the Patuxent as a spawning and nursery area (MMES 1985). Based on field studies, PEPCo concluded (Loos and Perry, 1989) that the reduction in anchovy recruitment for the Patuxent was 4% and that entrainment mortality could cause a reduction in forage fish biomass of about 3,000 to 15,000 pounds (dry weight). These estimates were based on field measurements of population size in the Patuxent and entrainment by Chalk Point. An independent analysis conducted by the state of the same data indicated that loss of bay anchovy in the estuary due to entrainment was approximately 14 to 51% (most probably 20 to 30%) annually (Versar, 1989). PEPCo (Loos and Perry, 1989) calculated the value of the entrainment losses at $150,000 per year (1989 dollars) based on its loss estimates. PEPCo also calculated the cost of BTA alternatives (cooling towers and wedgewire screens) as ranging from $10,000,000 to $288,000,000 (1989 dollars). According to PEPCo, the alternatives evaluated varied in effectiveness in reducing entrainment from almost none to 100%. Maryland negotiated a mitigation plan in discussions with PEPCo. This plan was developed as a result of a number of factors, including the fact that there was a substantial difference between the cost of requiring BTA (such as cooling towers) and the environmental benefits. There was also substantial uncertainty regarding the magnitude of benefits and the nature of the impacted species. The negotiated settlement resulted in an NPDES permit requirement that PEPCo spend $200,000 per year on striped bass aquaculture or other species as requested by the Maryland Department of Natural Resources (DNR),

and $50,000 per year for aquaculture of yellow perch or other species as agreed upon by DNR. This permit condition contemplated the production of 200,000 striped bass and 50,000 yellow perch per year. The permit additionally required PEPCo to provide $100,000 per year to the state for environmental education or for projects to remove obstructions to anadromous fish.

We believe a sound decision was made based on the success of this mitigation program. In this case, this program included creating a fish hatchery for potentially impacted fisheries and provision of funds for removal of obstructions to migratory fishes on tributaries, by removing dams or providing fish passage facilities. Results of the hatchery and stocking program resulted in the production and release of 3.5 million juvenile striped bass to date, the total estimated weight of which exceeded the estimated weight of forage fish lost from entrainment at Chalk Point. At the end of 1997, 750,000 shad had also been produced; this species is currently the focus of fishery restoration efforts in Maryland. Each of these benefits is directly related to the enhancement of the State's fisheries. However, no specific "valuation" approach was used to arrive at the enhancement objectives; the agreement on numbers of fish to be reared and amount of funds to be used for passage enhancement were based on technical expertise of agency staff and PEPCo staff and consultants, and targeted the State's resource management objectives.

We believe that a critical component of the regulation is to assure the provision of substantial flexibility to allow States to direct restoration and enhancement

measures to their most pressing resource management needs. Placing rigid, restrictive criteria within the regulation would impose constraints on regulators that may not result in the greatest benefits to resources of concern and the resources of the states that are impacted.

EPA Response

For a discussion of the role and implementation of restoration measures in the final rule, see EPA's response to comment 316bEFR.08 1.007.

The final rule does not require a specific valuation approach to determine appropriate restoration measures. For specific requirements for restoration measures addressing species other than those impinged and/or entrained by a facility's cooling water intake structure, see section 125.95 in the final rule. EPA believes that the requirements for restoration measures in the final rule are important for ensuring a restoration measure addresses those adverse environmental impacts that derive from a cooling water intake structure.

Comment ID 316bEFR.202.029

Subject Matter Code	11.01
RFC: Proposed use of restoration measures	

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Organization NJ Dept of Environmental Protection

Restoration Measures

125.94(d), Restoration Measures

First and foremost, the Department considers Section 316(b) to be a technology driven provision. Any technology for which the costs are not wholly disproportionate to the benefits must be either required and/or studied for existing cooling water intake structures. However, in the event that fish protection technologies are not currently available to meet the performance measures at 125.94(b) at a particular site, the Department supports mitigation measures to minimize impingement/entrainment losses. There is no debate that wetlands aid in producing fish and therefore help mitigate the effects of a facility's impingement and entrainment losses. This is especially important since shrinking open space and lost wetlands have become a critical environmental issue. In addition, since entrainment technologies are still evolving and wetlands aid in producing early life stages of fish, restoration is clearly a good idea in the short term. The Department supports the inclusion of

restoration measures as part of Section 316(b) rules. However, this support is conditional on the premise that all technological options are carefully considered first and mitigation is not required as a substitute for technology.

To ensure that this concern is addressed, the Department suggests that 125.94(d) be changed as follows:

(d) Restoration Measures. In lieu of, or in combination with, reducing impingement mortality and entrainment by implementing design and construction technologies or operational measures to comply with the performance standards specified in paragraph (b) of this section or the Director's determination pursuant to paragraph (c) of this section, you may, with the Director's approval, employ restoration measures that will result in increases in fish and shellfish in the watershed. <ADD: Restoration measures can only be implemented after all appropriate intake protection technologies have been considered.> You must demonstrate to the Director that you are maintaining the fish and shellfish within the waterbody, including community structure and function, to a level comparable to those that would result if you were to employ design and construction technologies or operational measures to meet that portion of the requirements of paragraphs (b) or (c) of this section that you are meeting through restoration. Your demonstration must address species that the Director, in consultation with Federal, State, and Tribal fish and wildlife management agencies with responsibility for fisheries and wildlife potentially affected by your cooling water intake structure, identifies as species of

concern.

The Department prefers the restoration and/or preservation of wetlands to fish stocking. Fish stocking presents the risk of the introduction of disease and does nothing to remedy the problem of loss of aquatic habitat. Restoration and/or preservation of wetlands has the added benefit of enhancing fish production as well as creating and/or preserving habitat for those fish to live in. The Department also supports the installation of fish ladders as a mitigative measure to allow migratory fish to be re-introduced to historical spawning runs.

[see hard copy for insert/strikeout text]

EPA Response

For a discussion of the requirement in the final rule to consider technologies before choosing restoration measures, see EPA's response to comment 316bEFR.033.005. EPA does not want to preclude the use of restoration measures when they can achieve the environmental requirements of the final rule in a more cost-effective, more feasible, or more environmentally beneficial manner than design and construction technologies and operational measures.

The final rule gives permitting authorities the flexibility to make determinations on the feasibility of restoration measures on a site-specific, case-by-case basis. Permitting authorities should consider the net environmental benefits of any proposed restoration measure.

Comment ID 316bEFR.309.001

Subject Matter Code	2.04.06
Restoration measures in place of technologies	

Author Name Aubrey D. McKinney & Paul E. Davis

Organization Tennessee Wildlife Association & Tennessee Dept of Environment & Conservation

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It is critical that restoration be maintained as a regulatory option under Section 316 of the Clean Water Act.

EPA Response

Permittees may use restoration measures as a means to comply with the requirements of the final rule.

In the Supreme Court of the United States

No. A-____.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY AND STEPHEN L. JOHNSON, ADMINISTRATOR OF THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, APPLICANTS

v.

RIVERKEEPER, INC., ET AL.

APPLICATION FOR AN EXTENSION OF TIME WITHIN WHICH TO FILE A PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SECOND CIRCUIT

The Solicitor General, on behalf of the United States Environmental Protection Agency (EPA) and Stephen L. Johnson, respectfully requests a 30-day extension of time, to and including November 2, 2007, within which to file a petition for a writ of certiorari to review the judgment of the United States Court of Appeals for the Second Circuit in this case. The judgment of the court of appeals was entered on January 25, 2007. A petition for rehearing en banc was denied on July 5, 2007. Unless extended, the time for filing a petition for a writ of certiorari will expire on October 3, 2007. The jurisdiction of this Court would be invoked under 28 U.S.C. 1254(1). Copies of the

opinion of the court of appeals and the order denying rehearing are attached to this application.*

1. The Clean Water Act mandates, in some circumstances, that "the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact." 33 U.S.C. 1326(b). After considering a number of factors, including costs, EPA determined that closed-cycle recirculating cooling towers are not the best technology available for minimizing adverse environmental impact at existing large electrical generating facilities. Instead, EPA adopted a performance standard, under which such facilities must use a suite of technologies to reduce impingement mortality (trapping of large aquatic organisms against intake structures) by 80-95%, and entrainment (drawing of smaller aquatic organisms into such structures) by 60-90%, depending on several factors. 475 F.3d at 89, 92-94.

2. The Second Circuit upheld portions of the rule, but remanded several others. 475 F.3d at 89. Among other things, the court held that EPA may not generally consider the relationship of costs to benefits in determining the best technology available for minimizing adverse environmental impact. Id. at 88-89.

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* On April 13, 2007, the government sought and obtained a 30-day extension of the time within which to file a petition for a writ of certiorari. A different party later filed a timely en banc petition, and accordingly the 90-day period within which to file a petition for a writ of certiorari did not commence to run until after the court of appeals' denial of that party's rehearing petition. See S. Ct. R. 13.3 ("[I]f a petition for rehearing is timely filed in the lower court by any party, * * * the time to file the petition for a writ of certiorari for all parties (whether or not they requested rehearing or joined in the petition for rehearing) runs from the date of the denial of rehearing.").

In the court of appeals' view, "EPA may permissibly consider cost in two ways: (1) to determine what technology can be 'reasonably borne' by the industry and (2) to engage in cost-effectiveness analysis," i.e., "to choose a less-expensive technology that achieves essentially the same results" as a more expensive available technology. Id. at 99-100. Because the court found the basis for EPA's determination to be unclear, it remanded for the agency to clarify and if necessary reassess its reasoning. Id. at 101, 102-103.

3. The Second Circuit has previously explained that because Section 1326(b) gives EPA broad authority to determine how to weigh costs and other relevant factors in determining the best available technology to minimize environmental impacts, judicial review of EPA's weighing must be highly deferential. Riverkeeper, Inc. v. EPA, 358 F.3d 174, 195-196 (2d Cir. 2004). Another court of appeals has similarly upheld EPA's balancing of costs and other factors where costs would be wholly disproportionate to benefits. Seacoast Anti-Pollution League v. Costle, 597 F.2d 306, 311 (1st Cir. 1979). In contrast, the decision in this case oversteps the courts' bounds under Chevron USA, Inc. v. NRDC, 467 U.S. 837 (1984), by confining the agency's consideration of costs to two specific inquiries not mandated by the statute's text, structure, or history.

The Solicitor General has not yet determined whether to file a petition for a writ of certiorari in this case. An extension of time is requested to permit further consideration of the legal and practical ramifications of the court of appeals' decision and, if a decision is made to file a petition for a writ of certiorari, to prepare and print the petition.

Respectfully submitted.

PAUL D. CLEMENT
Solicitor General
Counsel of Record

SEPTEMBER 2007